

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

DIESEL PROGRESS



FIVE DOLLARS PER YEAR

MAY, 1956

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"In perfect condition after 8,550 hours"

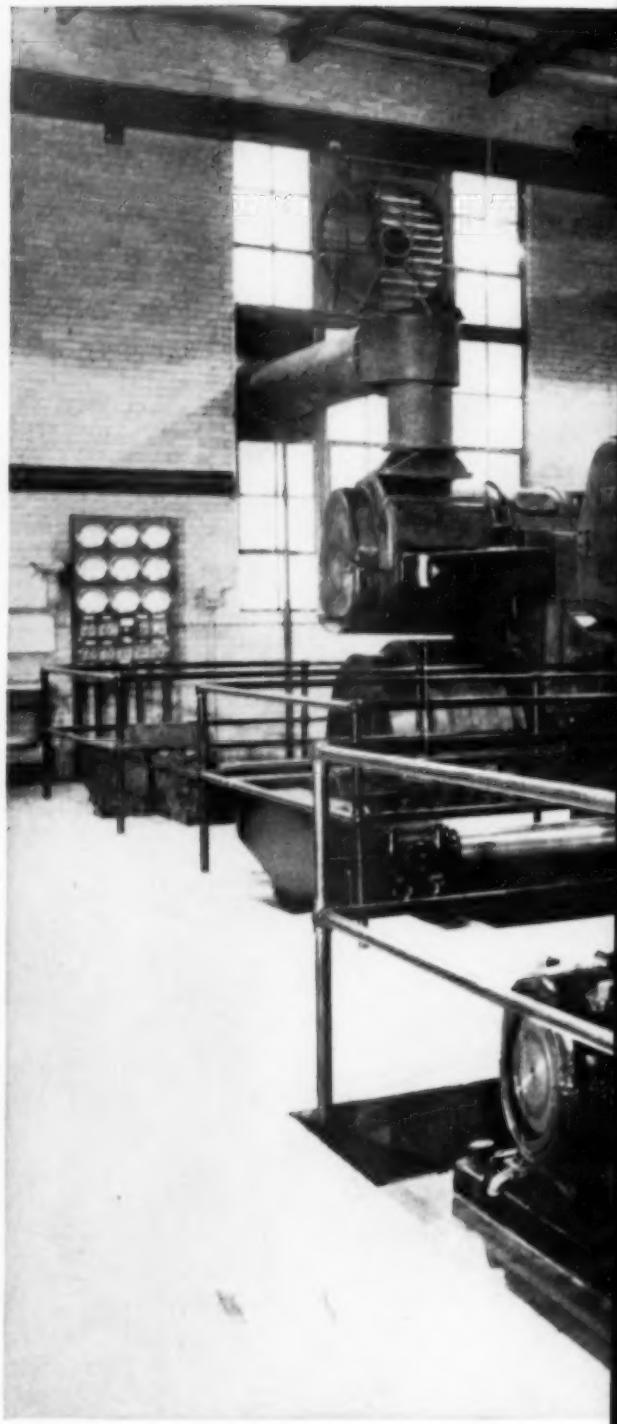
— an engine performance report from the Paris, Kentucky, power plant.

Three dual-fuel and two straight diesel engines are in operation at this efficiency-conscious power plant. *Texaco Ursa Oil Heavy Duty* lubricates all these engines—keeps them clean and wear-free; assures smooth, dependable performance. Reports Mr. Zane F. Barnes, Plant Superintendent:

"A scheduled overhaul on one of our dual-fuel engines after 8,550 hours showed rings in excellent shape, wear on liners less than .0005 inch, no evidence of wear on bearings. Check-ups on our other units show substantially the same results—proof that *Texaco Ursa Oil Heavy Duty* is really doing a great job."

"When you combine Texaco's top quality with experienced Texaco Lubrication Engineering Service, you've got a team that assures highest plant efficiency at lowest operating cost."

You'll find outstanding results like these in every plant where Texaco is on the job. There is a complete line of *Texaco Ursa Oils* to meet the requirements of all diesel, gas and dual-fuel engines. And because these world-famous oils consistently assure *more power with less fuel over longer periods* between overhauls, it is a fact that—



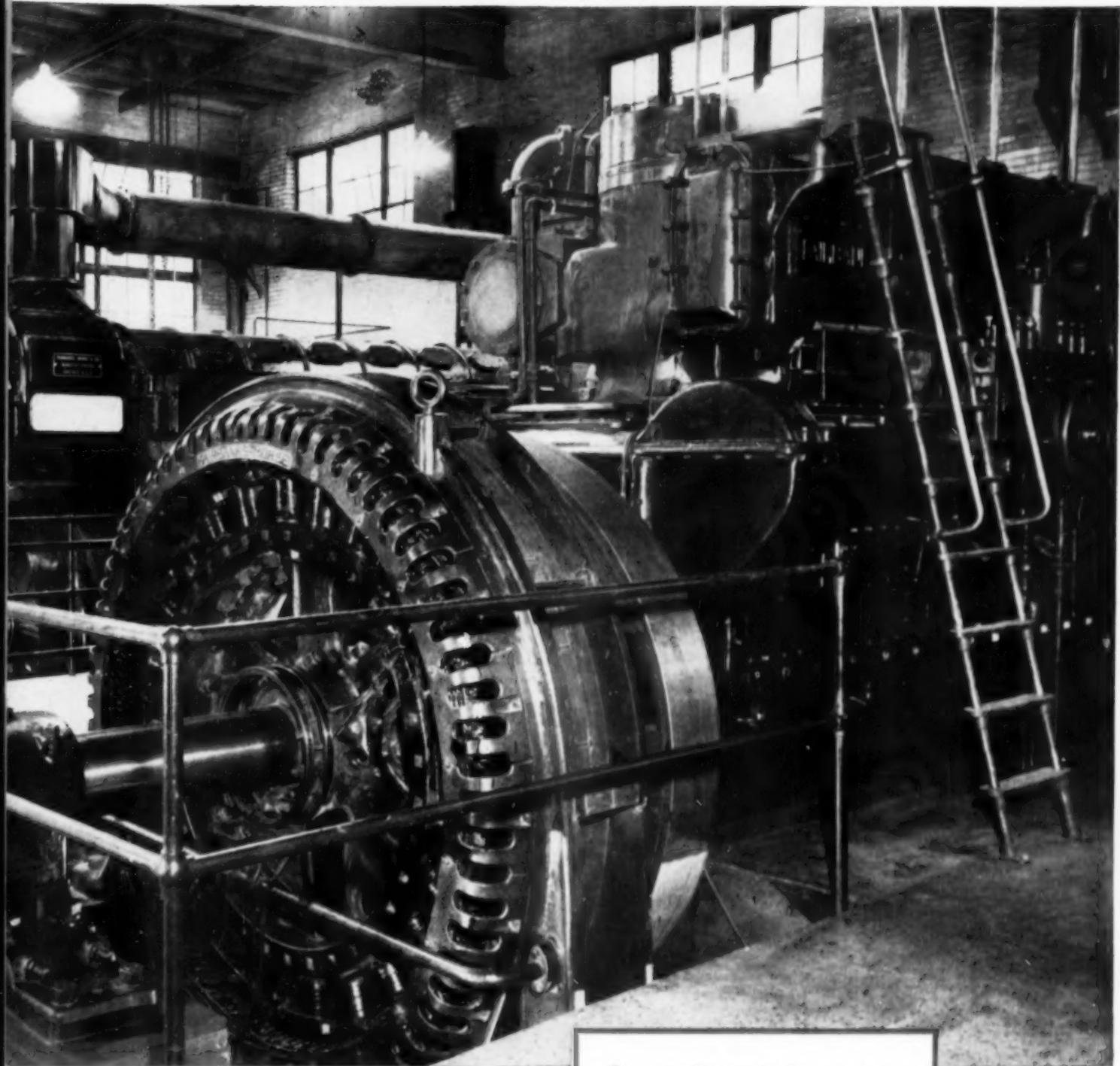
For over 20 years, more stationary diesel h.p. in the U. S. has been lubricated with Texaco than with any other brand.

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TEXACO



improve engine performance, cut maintenance costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

Power facilities at the Paris, Kentucky, plant. Equipment includes: two Fairbanks-Morse 1,920 h.p. dual-fuel engines; one 7-cylinder, 1,400 h.p. dual-fuel; and two Fairbanks-Morse diesels—1,600 and 1,050 h.p. All are lubricated exclusively with Texaco Ursal Oil Heavy Duty.

URSA OILS

FOR ALL DIESEL, GAS
AND DUAL-FUEL ENGINES



on the rails — in the oil fields — in electric-utility service

GENERAL MOTORS 567C 2-Cycle Diesel Engine

6-, 8-, 12- and 16-cylinders, 600 to 1750 H.P.

THE UNMATCHED efficiency and economy of the General Motors 567C 2-cycle Diesel engine—proved in billions of miles of main-line service on railroads—is now being extended to new areas of usefulness.

Through Electro-Motive's long standing engineering policy of making component improvements applicable to earlier models, railroads today are realizing the second step in obtaining maximum economy from dieselization—remanufacture of older Diesel units. Diesels reaching the time for major overhaul can be *remanufactured* and *upgraded* with the 567C engine to today's production standards—at less than half the cost of a new locomotive unit.

The 8-cylinder 567C engine is prime mover in the new Electro-Motive Diesel-Electric Drilling Rig Power Plant which

offers the petroleum industry a new concept of lower-cost drilling rig power both on land and offshore.

And new Electro-Mobile Power Units provide electric utilities with a flexible, economical tool for fringe area boosting, peak skimming and emergency use. Built in rail units of 1000 and 750 kw.; truck units of 500 and 350 kw.; and portable units of 1000, 750, 500 and 350 kw. capacities for permanent or semipermanent installations, they serve immediate needs, reduce line costs and help utilities

to postpone heavy investments in stationary facilities.

Mass-produced on the long-established lines of Electro-Motive Division's specialized plants, General Motors 567C Diesel engines and engine-generator units cost less than others of comparable capacity. Servicing facilities are nationwide. And the equipment investment is protected by a modernization program that prevents obsolescence.

We invite inquiries of engineers interested in any of the above applications.



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MEMBER OF



Business Publications Audit
of Circulation, Inc.

DIESEL PROGRESS for
May, 1956, Vol. XXII,
No. 5. Published Monthly
by Diesel Engines, Inc., 816
N. La Cienega Blvd., Los An-
geles 46, California. Phone
OLeander 5-7410. Subscrip-
tion rates are \$5.00 for
U.S.A. and possessions. All
other countries \$7.50 per
year. Subscriptions may be
paid the London office at
£2-12s-6d per year. Accepted
as Controlled Circulation
Publication at Los Angeles,
California.

DIESEL PROGRESS is in-
dexed regularly by Engineer-
ing Index, Inc.

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FRONT COVER ILLUSTRATION

Two Caterpillar Diesel
D975 Marine Engines fur-
nish propulsion power
while two DS18 Diesel
Electric Sets furnish aux-
iliary power aboard the
Halliburton 208 operating
out of New Orleans, La.
This is the world's third
ocean-going cementing
ship working on off-shore
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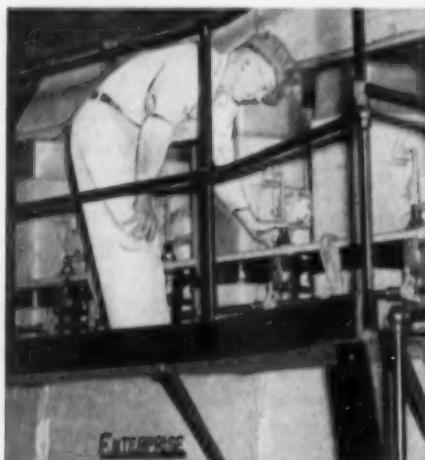
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At the Dual Fuel "Select-O-Matic"® control, "Pete" Leslie demonstrates ease of change-over from dual fuel to straight diesel operation of 1000 kw Enterprise Engine never drops a cycle changing either way!

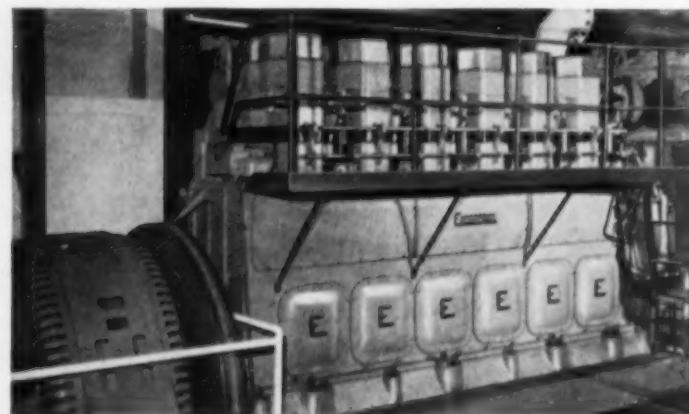


"Our Enterprise is one of four diesels in the plant, and it carries almost all of the load, 24 hours a day. That's because it's the most economical and dependable engine we've ever operated. Whether it's on dual fuel in normal periods, or on straight diesel during light loads of 300 kw or less, this engine performs very, very well. We like the safe margin of reserve it gives us, too—even during peaking periods."

Mr. "Pete" Leslie points out what a really profitable power plant means to the city of Paulding. Electric

"We Added an Enterprise Dual Fuel Engine—Now Save \$700 a Month on Fuel and Lube Oil Alone!"

Says JAMES J. LESLIE, Superintendent,
Paulding Light & Water Works, Ohio



The 1400 HP Enterprise has logged over 21,000 hours without any major maintenance. Valves have not been ground, rings never replaced. No overhaul will be planned until there is some evidence of work required!

Chief Engineer Perry "Jack" Jackson on routine inspection of Enterprise Turbocharged Model DGQ-316. After two and one half years on local natural gas and diesel fuel oil No. 2, firing pressures and exhaust temperatures have remained exceptionally even.

rates have been reduced substantially. Street lighting, power for the City Hall, and a beautiful municipal swimming pool have been provided at no cost to taxpayers.

This is another example of how cities and towns throughout America benefit from dependable Enterprise Engines. Write us today for full information, or call your nearest Enterprise office. Models from 73 to 7703 HP in diesel, dual fuel, tri-fuel and spark ignited gas engines.

Over a million horsepower at work the world over!

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The first
comprehensive
filtration guide ever
edited specifically
for designers.



Where are filters used? Why are filters used? How do filters save money? Now for the first time Purolator's new "Filtration Manual for Designers" has all the answers gathered together in one place.

Some typical section headings

- space requirements
- filter costs
- selection of type of element
- deciding flow capacity needed
- economics of filtration
- how Micronic® and metal edge filters are made

"Filtration Manual for Designers" spells out application considerations in detail including degree of

filtration, flow rate, contamination to be removed, viscosity of fluid, plus a complete glossary of terms that apply to filtration. Printing of this manual is limited so please send coupon for your copy today.

PUROLATOR PRODUCTS, INC.

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Please send my copy of your "Filtration Manual for Designers."
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NAME _____

COMPANY _____ POSITION _____

STREET _____

CITY _____ STATE _____

Plastics Engineering Co., Sheboygan, Wisconsin, operates two fire-safe Allis-Chalmers fork trucks. One works in the kettle room where alcohol fumes are a hazard. The other moves material in the grinding room where there is danger of dust explosion.



when the sign says

FLAMMABLE

... better play it safe with Allis-Chalmers safety diesel trucks

In many plants, the very atmosphere is explosive because of dust or fumes. A single spark can touch off disastrous fires. While conditions like this call for the utmost care, the need remains for efficient material handling.

To meet this need, Allis-Chalmers has developed a Safety Diesel Fork Truck especially for hazardous areas. It runs on low-volatile fuel and requires no electrical system. The starter is hydraulic, gauges are mechanical, the horn is air-operated. As further precautions, surfaces of the manifold and muffler are water-cooled, exhaust gases pass through a water quench, tires

are grounded — the forks may be spark-proof manganese bronze.

These fork trucks are approved by the Mill Mutual Fire Prevention Bureau, and are in use at a rapidly growing number of plants where explosive conditions exist. Whether you need fire-proofed safety or unmatched material handling efficiency, you'll find an Allis-Chalmers fork lift truck is your wise choice. Write for literature, or get all the facts from your Allis-Chalmers Buda Division dealer.

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



BH-9

If you're in any
of these fields . . .



Marine



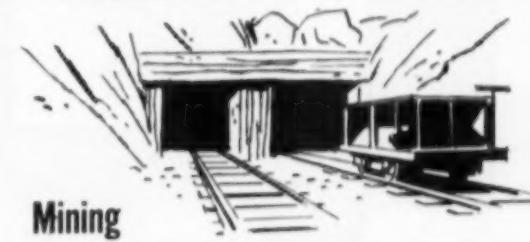
Oil



Construction



Agriculture



Mining

INVESTIGATE THE NEW

 * 

HAND-CRANKED INERTIA STARTER

This new hand-cranked inertia starter . . . available in four different models . . . is especially suited for use in remote areas and under difficult operating and climatic conditions.

Use the Bendix AE Inertia Starter where shock conditions can damage storage batteries or disrupt voltage regulation. Use it where battery maintenance

is a problem or where there is a fire hazard. Mounts in same place as conventional starter on standard S.A.E. 3-bolt flange.

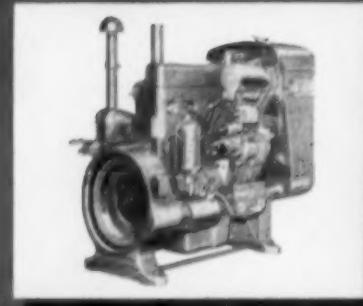
The Bendix AE Inertia Starter is simplicity itself to install. Requires No Cables—No Pumps—No Plumbing. Get full particulars today. BENDIX INTERNATIONAL DIVISION, BENDIX AVIATION CORPORATION, 205 E. 42nd St., New York 17, N. Y., Cable: "Bendixint", N. Y.

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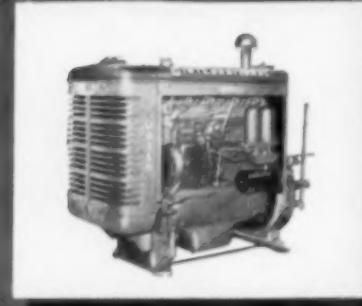


To get the advantages that only 54 years of engine
standardize on International

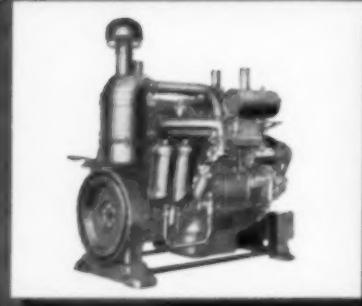
Here are 3 typical members of the International family of 18



U-169



UD-350



UD-525

U-169, rugged 4-cylinder 48.6 hp valve-in-head carbureted unit, delivers top performance on "regular" gasoline. Can be adapted to burn LPG, natural gas, kerosene, or distillate. Ideal for compactors, $\frac{1}{2}$ -yd excavators, water well drills, fork lifts, rotary snow plows, 12 to 15 kw generators.

UD-350, 4-cylinder diesel develops 78.5 bhp as an engine, 75 bhp as a power unit shown above. Available in air compressors, bucket loaders, asphalt mixers and driers, $\frac{1}{2}$ -yd shovels and cranes, portable screening plants, 25 to 40 kw generators, hoists, graders, pumps, and trenchers.

UD-525, 6-cylinder, 121 bhp diesel with all-weather push-button starting as standard equipment. Available with 14 major attachments, including 43-gal fuel tank, muffler, skid-type subbase. Fits 29 different excavators, graders, compressors, other construction tools.

International power units in various modifications are engineered to team with all these machines:



Shovels, Cranes, Draglines
17 Manufacturers



Crushers
5 Manufacturers



Motor Graders
5 Manufacturers



Fork Lifts
3 Manufacturers



Air Compressors
5 Manufacturers



Generators
5 Manufacturers



Road Rollers
4 Manufacturers



Trenchers
3 Manufacturers



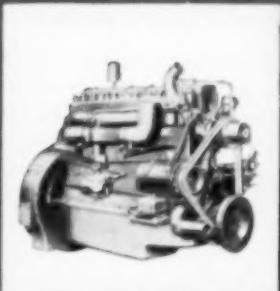
Asphalt Mixers and Pavers
6 Manufacturers



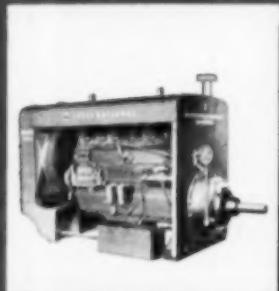
Pumps
12 Manufacturers

leadership can give . . .

Engines



U-450



UD-1091

U-450, one of the most popular 6-cylinder carbureted engines on the market today for trucks, water well drills, 35 to 50 kw generators, graders, $\frac{3}{4}$ -yd shovels and draglines, big rotary snow plows, ditchers and trenchers. Develops 118.5 belt horsepower.

UD-1091, diesel, largest of the 18 International engines, develops 214 bhp, provides exceptional fuel economy for 34 different makes of construction units, including 2 to $2\frac{1}{2}$ -yd shovels, 8-cylinder compressors, large asphalt plants and 75 to 100 kw generators.

Engine Model	Displacement (Cubic Inches)	Horsepower (with full equipment less fan)	Engine Model	Displacement (Cubic Inches)	Horsepower (with full equipment less fan)
CARBURETED ENGINES					
U-1	60	17 @ 2500	UD-264	264	57.5 @ 1800
U-123	123	31.2 @ 2000	UD-350	350	78.5 @ 1800
U-169	169	48.6 @ 2000	UD-14A	461	100 @ 1800
U-264	264	53.5 @ 1600	UD-525	525	121 @ 1800
U-220	220	64 @ 2400	UD-140-D	525	141 @ 2300
U-240	240	66.5 @ 2400	UD-18A	691	131.5 @ 1600
U-282	282	79 @ 2400	UD-1091	1091	214 @ 1500
U-372	372	96.5 @ 2200			
U-406	406	104 @ 2200			
U-450	450	118.5 @ 2200			
U-1091	1091	214 @ 1600			
DIESEL ENGINES					

In most fields, you'll probably agree, you get the most for your money from the company that's been a leader *for the longest time*.

In engines and power units, the outfit to turn to for longest leadership is International. Since starting manufacture in 1902, International has built and sold *millions of engines* for heavy-duty work! In these 54 years, International has pioneered in developing and perfecting many of the features you consider essential today. Valve-in-head design . . . all-weather diesel starting . . . replaceable cylinder sleeves . . . tocco hardening . . . lubrication through drilled passages . . . precision type bearings . . . full-flow oil filters, to name a few.

These cost-cutting features are backed up with such added advantages as:

Honest horsepower ratings at speeds you can use.

Easy installation with attachments to fit whatever jobs you have.

Fully-experienced sales engineers to help you select and install the engine which best does your work.

Unmatched adaptability, with the same basic engine available as regular or optional power with various modifications in many kinds of equipment (one typical International engine, for instance, fits an International crawler tractor and *46 makes* of loaders, compressors, asphalt mixers, pavers, excavators, generators, pumps, graders, and rollers). When you power with International, this ready adaptability lessens your parts inventory . . . simplifies and speeds operator training . . . makes your servicing problems a lot easier!

International engine owners get another tremendous benefit, too. To help them is one of the most experienced heavy-duty engine parts and service organizations in the world. At your service are 11 giant regional *parts depots*, 173 Industrial Power *Distributor* locations, and hundreds of Power Unit *Dealers*.

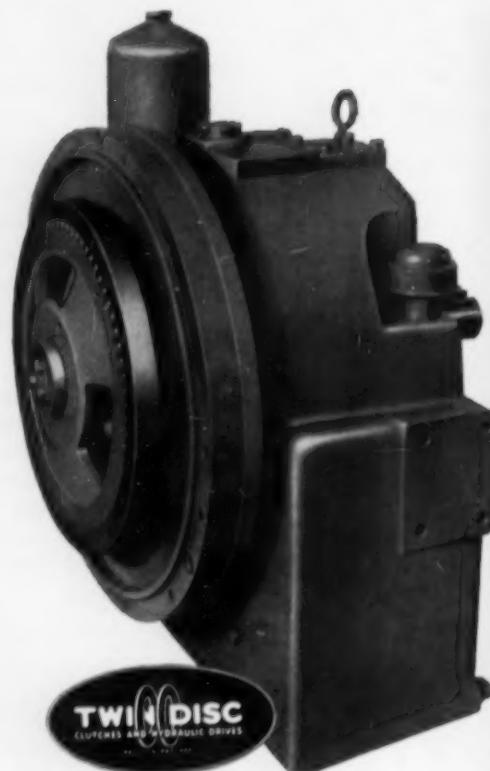
To get all these big profit-making advantages, be sure to specify International power. See your nearest Distributor or Dealer for all the facts.



International Industrial Power

180 N. MICHIGAN AVENUE—CHICAGO 6, ILLINOIS

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Diesel and Carbureted Engines



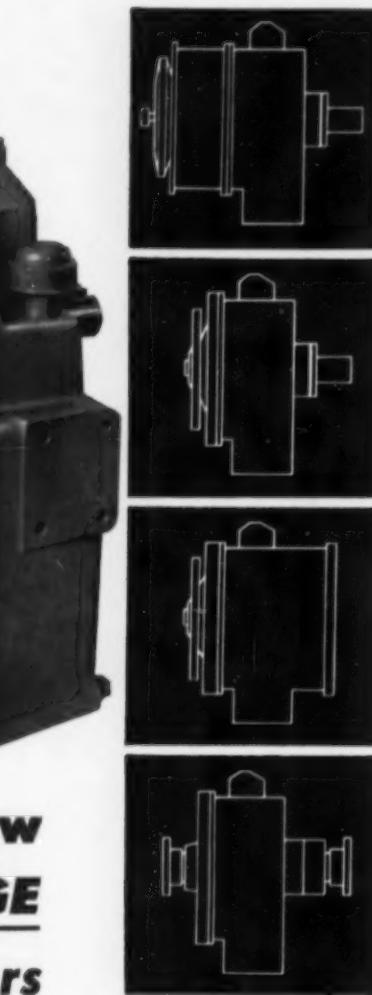
**announces new
SINGLE-STAGE
Torque Converters**

Here's another good answer to the power transmission problems involved in today's construction equipment—the all new Twin Disc Single-Stage Torque Converter.

The new single-stage torque converter is currently available in the 1500 Series, which is applicable to engines producing from 30 hp at 1150 rpm to 198 hp at 2400 rpm. Four models provide various input and output combinations.

Already time-proved by extensive field tests, this single-stage torque converter is ideal for use in shovels, draglines, front-end loaders . . . in all types of construction equipment requiring smooth, efficient, dependable torque multiplication.

This new Twin Disc Torque Converter will cut operating costs . . .



boost profits . . . handle the toughest jobs with ease. The converter's smooth flow of power eliminates sudden load shocks between engine and driven equipment . . . cushions out harmful vibrations.

Specify a Twin Disc Torque Converter, single-stage or three-stage, in your next piece of construction machinery or when you repower your present equipment.

**An ever-
to solve power**

Torque Converters

One of the first major manufacturers to apply torque converters to construction equipment was Allis-Chalmers Manufacturing Company. This was back in 1940, when Allis-Chalmers introduced its Model HD-14-C Tractor equipped with a Twin Disc Torque Converter.

Soon after this new concept in power transmission was introduced, however, the requirements of World War II channeled virtually all heavy construction machinery into military use. It was during this period that torque converter-equipped tractors truly came into their own . . . to meet the difficult construction demands of the rapidly changing Pacific Theatre of Operations.

After World War II, the torque converter quickly proved its worth in civilian duty as it had in military service. Within a relatively short time, construction men everywhere were well aware of the increased efficiency . . . the increased production . . . the over-all savings that could be gained through torque converter drives in construction machinery.

The torque converter multiplies engine output torque exactly as needed (the Twin-Disc Three-Stage, up to six times at stall, if required)—consequently, harmful, costly engine luging and stalling are eliminated. Shock loads and destructive vibrations are cushioned out—through fluid connection—and power is automatically matched to load demand.

News of these advantages quickly spread in the construction industry . . . and, within just a few years time, torque converters became a well-accepted feature in all types of construction equipment . . . in shovels, in tractors, in loaders, in off-highway equipment—wherever the many advantages of torque converters could be applied.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois
Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa

increasing trend to fluid drives

transmission problems on construction equipment



This torque converter-equipped crawler tractor receives a smooth, flexible flow of power—enabling it to do more work in less time. The converter in this particular tractor incorporates Twin Disc Three-Stage Torque Converter components.

Fluid Couplings

Along with the rapid acceptance and the increasing demand for torque converter drives in construction equipment, a wide choice in other fluid drives became available through use of the fluid coupling. This fluid drive provides the shock-cushioning and the overload protection of torque converters but is for applications *not* requiring torque multiplication.

Like Twin Disc Torque Converters, Twin Disc Fluid Couplings transmit power through fluid, absorbing shock loads and harmful vibrations. Their chief advantage is for those applications to construction equipment with hard-to-start characteristics and where the engine must operate at its most efficient speed and output. Efficiency of fluid couplings is high, with a maximum "slip" of only 4% at normal operating speed and power output.

Conveyors, crushing equipment, winches, vibrating screens, cranes—these are just a few of the many types of equipment used in the construction industry that profitably incorporate Twin Disc Fluid Couplings.

A favorite type of fluid drive with construction men is the Twin Disc

Fluid Power Take-Off. For this reason, manufacturers like The Thew Shovel Co. have offered this fluid drive as standard for many models of their products for many years. The Twin Disc Fluid Power Take-Off mounts directly on the engine flywheel housing, making an efficient, economical, compact power package for shovels, draglines and other powered machinery.

Another commonly used fluid coupling is the Twin Disc HYDRO-SHEAVE® Drive. This unit combines the advantages of a fluid coupling and a sheave for V-belt drive—in a single, unusually compact package. It is available for engines and motors producing from $\frac{1}{4}$ to 50 hp.

A Complete Line

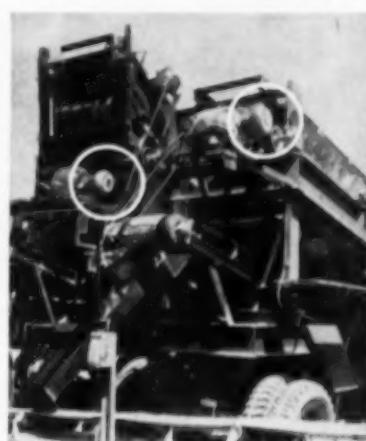
First to introduce the torque converter to this country, Twin Disc has maintained its leadership in the industry through the ensuing years. Therefore it's not surprising that the latest announcement of interest to construction men also comes from Twin Disc. It is a new line of *single-stage* torque converters. Currently available are the 1500 Series models for engines producing from 30 to 198



This power shovel is a typical application of Twin Disc Fluid Couplings on construction equipment. It benefits from the shock-cushioning characteristics of a Twin Disc Fluid Power Take-Off.

hp. Development of additional sizes of single-stage torque converters is in progress and their availability will be announced shortly.

In addition to the most complete line of *fluid* drives available, Twin Disc also offers a complete line of friction clutches—and recommends these drives when they are best suited to a particular piece of equipment on a particular job. For example, Twin

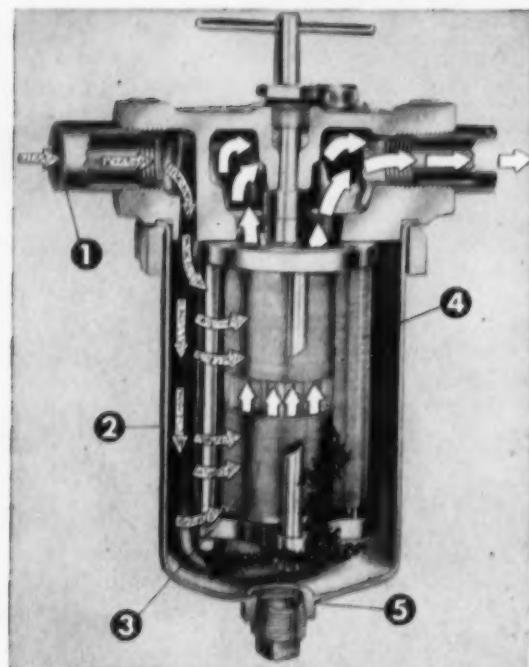


This vibrating screen works through another Twin Disc Fluid Coupling, the HYDRO-SHEAVE® drive. By picking up heavy starting loads smoothly and evenly, the HYDRO-SHEAVE protects both driving and driven equipment.

Disc Friction Clutches may be found on portable compressor units, mobile cranes, pumping units—in all heavy-duty construction applications where friction-type clutches prove most advantageous.

Yes, wherever you find construction equipment—from New York to Calcutta, from Seattle to Melbourne—you'll find Twin Disc Fluid and Friction Drives at work, solving the really *tough* problems involved in *proper* power transmission for construction equipment.

New CUNO SUPER Auto-Klean Filter can boost engine life up to 50%



HOW IT WORKS. Dirty oil enters inlet (1) at left, fills housing (2) and flows through metal edge-type filter. (3) Clean oil rises through center of filter, leaves at right. Dirt combed out by cleaner blades (4) is removed through drain (5).

Here's what the U.S. Army has done to test Cuno's new 40-micron SUPER Auto-Klean filter for their engines:

They ran destruction tests on several identical engines equipped with different brands of filters. As they ran, dust was introduced into the air intakes. When compression fell to half its initial value, the test was stopped. Best life for engines equipped with cartridge-type filters was 60 hours.

The engine with SUPER Auto-Klean ran 90 hours—50% longer—and compression was still above half its initial value!

You can get SUPER Auto-Klean now!

Just specify that the manufacturer equip your new diesel with this latest and best in filtration—both for fuel and full-flow lube. You'll get longer engine life and . . .

1. **Full-Flow** 40-micron filtration with a self-cleaning filter. No cartridge changes; filter can't rupture or channel.

2. **Low pressure drop.** An 8- by 2½-inch filter element handles 30 gpm of 200 SSU lube oil with only 3 psi pressure drop. You get high capacity in a small package.

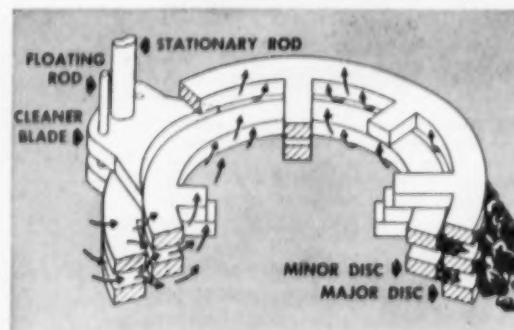
3. **All metal.** Can't absorb or adsorb additives from oil.

4. **No interruptions for cleaning.** Handles full flow all the time.

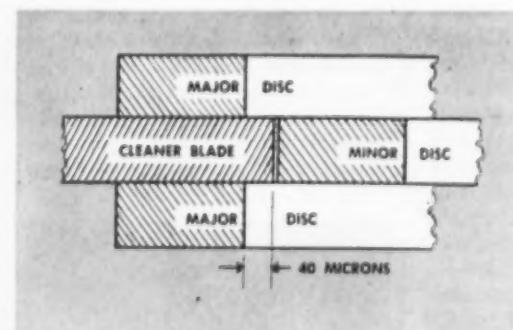
5. **Standard Auto-Klean housing.** On existing engines you can easily replace most 2½ in. diameter cartridges with SUPER Auto-Klean or simply install SUPER Auto-Klean in the full-flow lube line following the discharge of the engine pump.

Write today for complete technical data on the new SUPER Auto-Klean for your new or existing diesel. Ask for Catalog No. SAK-057. Cuno Engineering Corporation, 10-5 South Vine Street, Meriden, Connecticut.

55



FILTER ELEMENT consists of stacked major and minor discs and cleaner blade bearing against precision ground minor disc. Oil flow is shown by arrows.



LARGE PARTICLES (over 0.012 in.) are stopped at space between major discs. Short 40-micron restriction stops 40-micron particles, but allows high flow rate.



ENGINEERED FILTRATION

Removes More Sizes of Solids From More Kinds of Fluids

AUTO-KLEAN (edge-type) • MICRO-KLEAN (fibre cartridge) • FLO-KLEAN (wire-wound) • PORO-KLEAN (porous metal)

COOL CROSSING



HARRISON KEEPS TEMPERATURES LEVEL ON POPULAR CIRCLE LINE FERRY BOAT

It's always smooth sailing . . . when Harrison drops anchor on the heat! Harrison heat exchangers keep operating temperatures at bay on today's high-powered marine diesels . . . assure cool performance with top efficiency and economy, even under heavy loads. You'll find Harrison specified in every line of industry—and national defense—from dump trucks to jet fighter planes . . . from hydraulic presses to submarines. That's because Harrison's 45 years' experience in design, research and manufacture pays off in top-quality heat control products. If you have a cooling problem, look to Harrison for the answer.



HARRISON

RADIATOR DIVISION, GENERAL MOTORS CORP., LOCKPORT, N.Y.

TEMPERATURES

MADE
TO
ORDER

NOW...

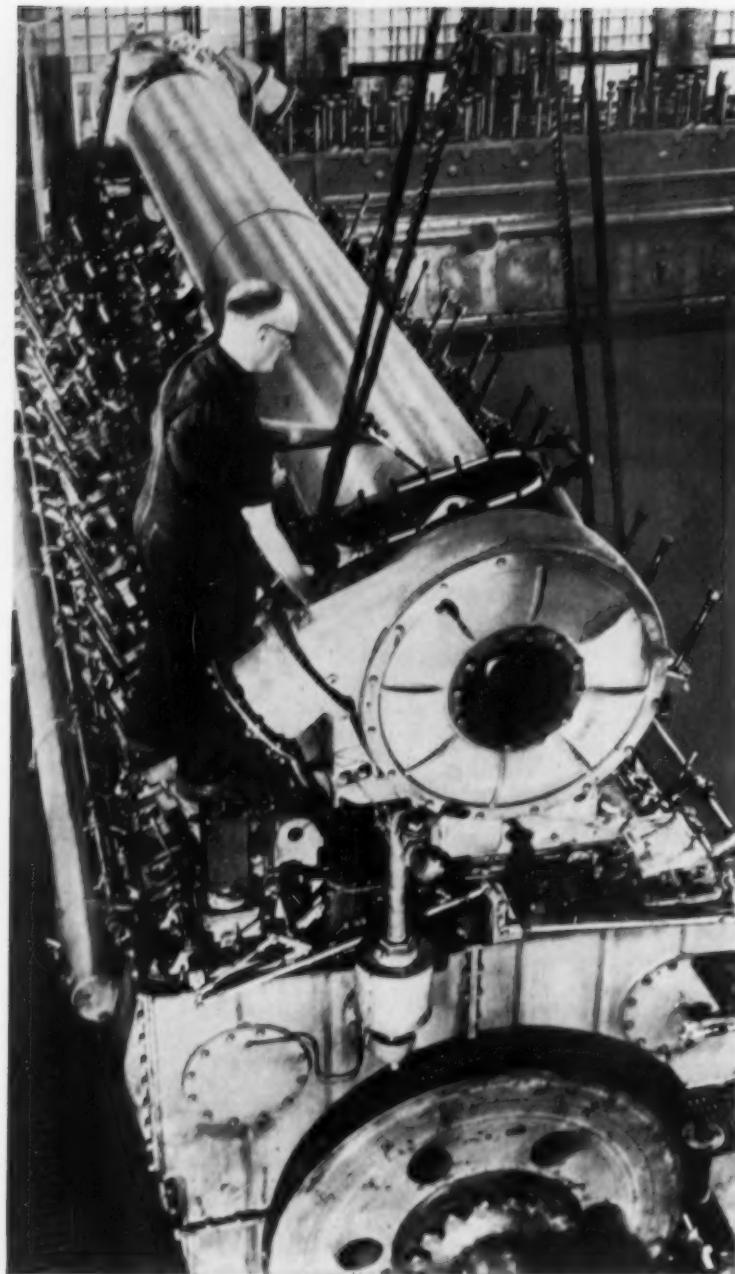
**America's first big
diesel built to take
full advantage of
turbocharging**

America's first diesel designed and built for turbocharged operation up to 5,000 hp has been hailed as the greatest power engine advance in over twenty years. Fourteen engines on order in its first production year prove unusual user acceptance. Some important reasons for this success are massive component design, compact construction for lower foundation and installation costs, and continuous high power operation on the most economical, locally available fuels.

Worthington's SW 14 offers you performance ratings that are conservative by *any* standard. You can only get this degree of reliability in a turbocharged engine when it's designed specifically for high cylinder pressures under continuous heavy duty operation. A "souped-up" engine just doesn't meet SW 14 standards.

It's as easy as calling your nearest Worthington Office to get the whole story on the SW 14, or write Worthington Corporation, Section E61, Harrison, New Jersey, for Bulletin S-500-B60.

E.61

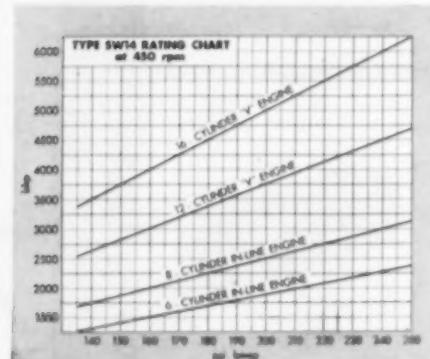


WORTHINGTON



ECONOMICAL, CONTINUOUS POWER

Diesel, Dual-Fuel and Spark-Ignition Engines from 150 to 5000 BHP



With SHELL ADC^{*} Oilprint Analysis ...

Part of the fleet operated by Cleveland-Lorain Highway Coach Co., Lorain, Ohio, lubricated by Shell Rotella Oil and protected by Shell ADC^{*} Oilprint Analysis.



"Extended oil drain intervals... lower repair costs"

HERE'S ANOTHER transportation company that has found the Shell ADC^{*} Oilprint Analysis a cost-saving tool of preventive maintenance. By its use, oil drain intervals have been extended safely on some new diesel coaches.

Furthermore this fast, reliable oil check has revealed many potential troubles in advance, such as oil contamination due to block fracture . . . in time to save costly repair bills. The Cleveland-Lorain Highway Coach Co. is enthusiastic about it.

The Shell ADC Oilprint Analysis enables fleet operators to test crankcase oil in the short time allotted for re-fueling and crankcase oil checks . . . mere minutes. It eliminates draining still-good oil and the risk of using oils loaded with contaminants.

Let us demonstrate how we can put this new cost-saving PM tool to work for you.

*Trademark

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA



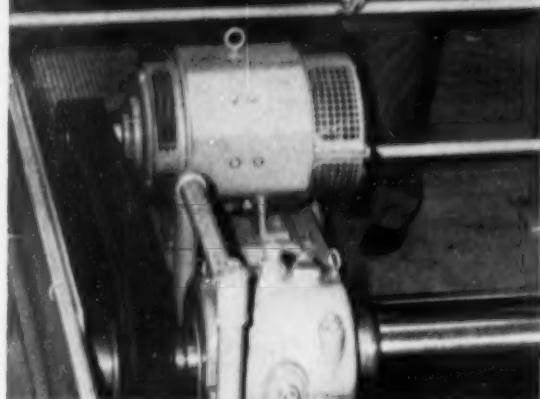
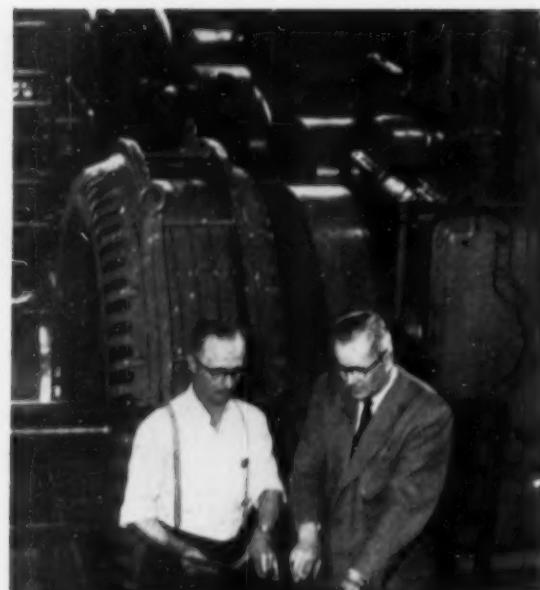
One Drop tells the Story!

The operator places just one drop of oil on the card. Analysis gives conclusive check of oil's condition.



This utility gets better engine performance ... less cylinder and ring wear with **STANODIESEL Oil M**

*Report on Cumberland,
Wisconsin, Municipal Utility's
experience with diesel lubricants.*



Clarence Maxcy (left), Chief Engineer at Cumberland, and Standard Oil lubrication specialist Ralph Rowlands check efficiency records of utility's engines lubricated with STANODIESEL Oil M. Providing technical service on lubrication problems is something for which Ralph Rowlands is well qualified. He has been doing this sort of work with Standard for 13 years. Ralph attended the University of Wisconsin and is a graduate of the Standard Oil Sales Engineering School.

Management of Cumberland, Wisconsin, Municipal Utility found a way to extend time between ring changes, to get greater fuel efficiency and to cut cylinder wear. How? By using STANODIESEL Oil M.

Before converting to STANODIESEL Oil M, the utility found it necessary to change rings every 1,500 to 2,500 hours. Cylinder wear ranged up to .003" per 1,000 hours of operation. After the engine was converted to STANODIESEL Oil M, it was run 7,800 hours at 50 to 90 per cent of full load. No rings had to be replaced during that time. The engine was then overhauled. All rings were free. All pistons were clean and in excellent condition. Ring wear was apparent on the two top rings only, bottom rings were like new. Cylinder wear after 7,800 hours averaged .003". This amount of wear occurred after 1,000 hours with the oil formerly used. On some cylinders, wear was only .001". Maximum bearing wear was .0005". Fuel efficiency over the period averaged 12.93 K.W.H. per gallon.

This kind of performance—reduced wear, increased fuel efficiency, improved overall engine performance—is what you can expect from STANODIESEL Oil M. Find out more. Call your nearby Standard Oil lubrication specialist. There is one near you in any of the 15 Midwest and Rocky Mountain states. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY
(Indiana)



Piston from engine using STANODIESEL Oil M photographed just as it was pulled for 7,800 hour overhaul. Piston is clean and in excellent condition.



Quick Facts About

STANODIESEL OIL M

- Is refined from highest quality base stock. Has superior stability.
- Contains special additives that:
 - Inhibit oxidation, control unwanted increases in oil viscosity.
 - Keep crankcase, pistons, cylinder walls and other parts clean.
 - Keep contaminants in suspension, prevent them from depositing.
 - Control foam, make oil suitable for use in hydraulic governors.
 - Increase the oil's ability to reach and maintain a film on highly stressed parts.



6th

NORDBERG ENGINE for Neodesha, Kansas

"HIGHLIGHTS" OF POWER PLANT GROWTH

1922—Installed 2 Nordberg 550 hp engines in Neodesha plant.

1934—Installed Nordberg 880 hp engine.

1946—Installed Nordberg 1620 hp engine.

1952—Installed Nordberg 1750 hp engine.

1956—Sixth Nordberg engine to be installed . . . a 16 cylinder V-type Supairthermal® Duafuel engine rated 3150 bhp, 2250 kw.

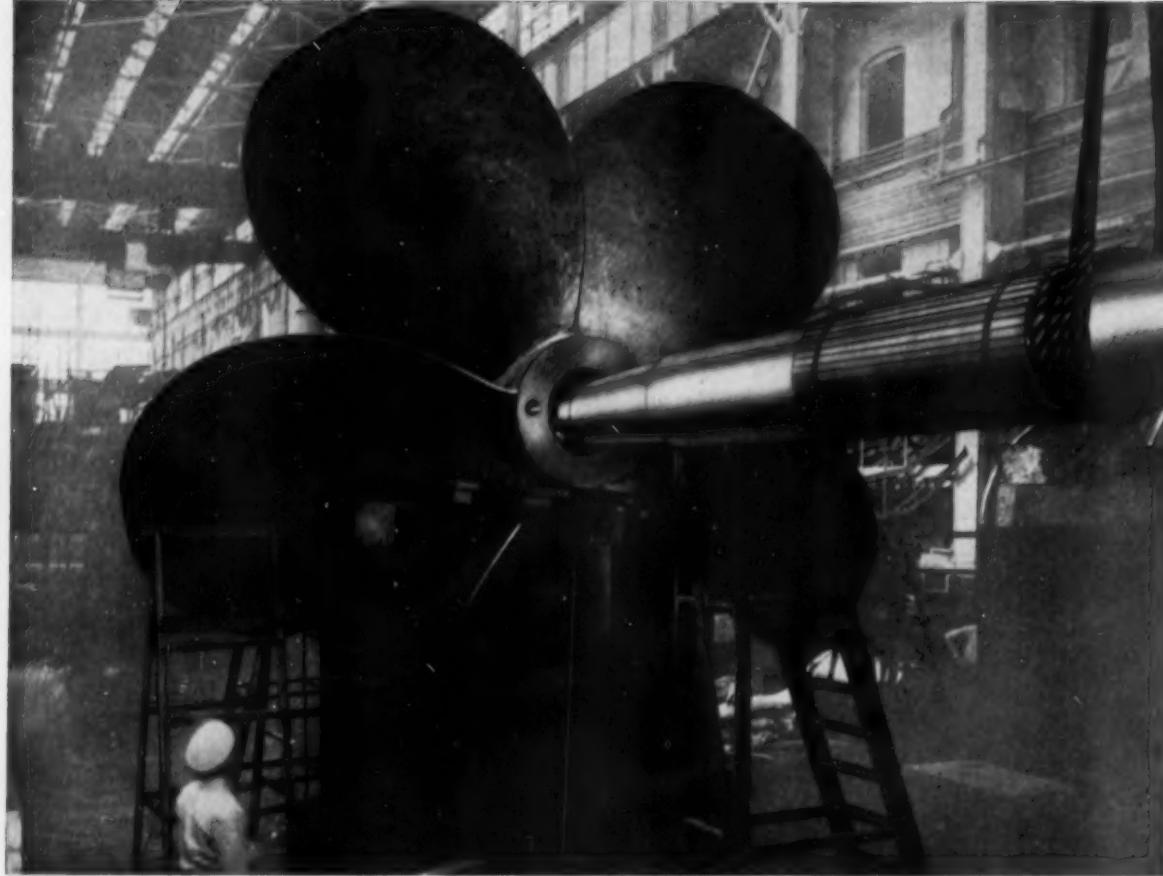
Dependable engine performance builds repeat orders . . . and a case in point is the fact that the City of Neodesha, Kansas, has now ordered its sixth Nordberg engine. As an example of the kind of performance these engines deliver, here are some of the figures taken from operating records kept on Neodesha's fifth Nordberg engine—a 1750 bhp, 1235 kw Duafuel® unit.

According to Everett Powell, Superintendent, Neodesha Electric & Water Plants, from February 14, 1952, the date this engine was put on the line to March 1, 1956, a period of just over four years, it has run 34,370 hours out of a possible 35,784 . . . which means that this engine has operated over 96% of its total installed hours without even removing a piston or cylinder head—a most outstanding record. In compiling this record, the engine has been producing approximately 88% of total plant production. With performance like that, it was natural that city officials again chose Nordberg to meet increased demands. Their sixth Nordberg unit, shown above is a 16 cylinder Supairthermal engine rated 3150 bhp, 2250 kw.

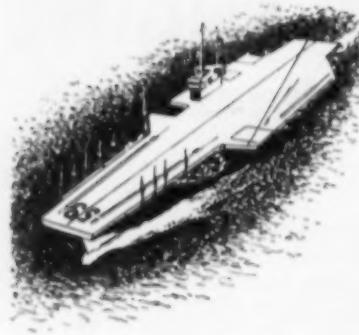
For engines to meet your power needs write Nordberg . . . pioneer in the building of heavy duty engines from 10 to over 12,000 hp.

NORDBERG MFG. CO., Milwaukee, Wisconsin





Aboard the U. S. S. FORRESTAL . . . Erie Forge Propeller Shafts



No better example of the capabilities of Erie Forge & Steel Corporation could be offered than the one above. For many years our skilled craftsmen have made steel ingots from raw materials, transformed them into finished products to meet the demands of power transmission in wide variety . . . finished cranks, rotor shafts, drive shafts, connecting rods, a wide diversity of steel castings for industry . . . completed within the confines of one plant with one responsibility and under one control.

Consult with us on your forged steel and steel casting projects — each of us will profit.

ERIE FORGE & STEEL CORPORATION • ERIE, PENNSYLVANIA



MEMBER AMERICAN IRON AND STEEL INSTITUTE



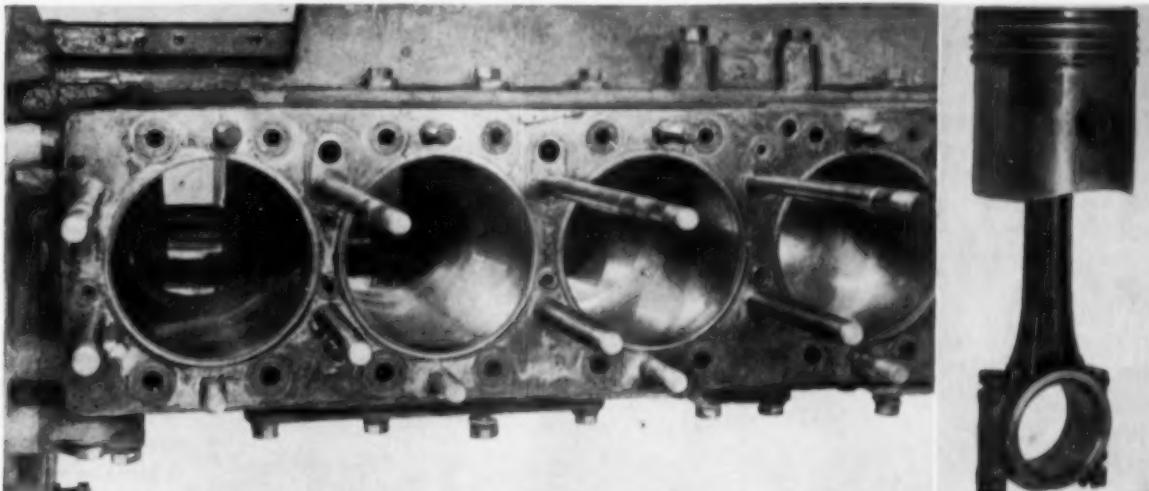
The Engineer's Report

CASE HISTORY

LUBRICANT RPM Delo Oils

Boise-Winnemucca Stages Inc.
FIRM Boise, Idaho

Cylinder wear only 0.006" after 228,413 miles!



USING RPM DELO SPECIAL LUBRICATING OIL, this 180-H.P. Fageol engine went 228,413 miles without repairs of any kind, in a bus owned by Boise-Winnemucca Stages, Inc. It ran in intense summer heat and sub-zero winter temperatures on the line's

regular route. Wear on cylinders measured only 0.004" to 0.006" and crankshaft journals were still factory standard. All rings were free, all bearings good and pistons showed no varnish. There was no measurable wear on crankshaft or wrist pins.



REMOVED FOR FIRST TIME, oil pan shows no deposits, clean metal is visible after draining. RPM DELO Oils reduce wear and keep engines clean in all of the buses owned by Boise-Winnemucca Stages.

FREE FOLDER tells you about all the RPM DELO Oils and how they meet every heavy-duty engine condition. Write or ask for it today.

FOR MORE INFORMATION about petroleum products of any kind or the name of your distributor, write or call any of the companies listed below.



How RPM DELO Oils reduce wear, corrosion, oxidation in all heavy-duty engines



- A. Contain special additives that provide metal-adhesion qualities...protect parts whether hot or cold, running or idle.
- B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring sticking. Detergent keeps parts clean...helps prevent piston scuffing.
- C. Special compounds stop corrosion of any bearing metal and foaming in crankcase.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

Straws in The Business News

WHAT STARTED as a moderately optimistic business year has developed into a continuing business growth despite the original overtones of apprehensive gloom in some quarters. The first quarter brings news of dividends equal to or

higher than those of last year and business expansion.

EATON MFG. will, most likely, show an increase in sales and profits for the past quarter. Link-Belt sales for the first quarter will probably maintain the high level of the last quarter of 1955. Rockwell Manufacturing, maker of meters, valves and power tools reveals that

orders are running 25% ahead of a year ago. Worthington Corporation expects earnings to run an estimated 15% ahead of 1955. Unfilled orders at the end of the first quarter will be about \$67 million as compared to \$50 million for the same period last year. DeLaval Steam Turbine Company reports net sales of about \$22.6 million for 1955. International Harvester February sales rose 2%

from 1955. Clark Equipment reports first quarter operations continued at a "satisfactory level."

PIERCE GOVERNOR Company has acquired STD Inc. Std. will become the Standard Division of Pierce Governor. The Division manufactures pressed metal products and painted assemblies. Present plant, 70,000 square ft., will continue to operate at its current site at Alliance, Ohio.

TRANE COMPANY has revealed the award of a \$1 1/4 million construction contract for a new engineering and office building. Completion is expected by February 1, 1957. It will house the rapidly expanding product and design departments. Official opening ceremonies for Caterpillar Tractor's wheel tractor and motor grader manufacturing plant at Decatur, Illinois is set for late May. The plant will employ 3,000. Viking Pump Company has purchased a 40-acre site near Cedar Falls, Iowa for the erection of a new plant. All operations will be placed in the new center, it is anticipated.

ELECTRO-MOTIVE DIVISION of General Motors will increase floor space of its LaGrange plant by over 40%, creating 2,000 new jobs. General Electric is planning an approximately \$7 million gas turbine expansion at Schenectady. Esso Standard is in the process of expending about \$40 million on its Baton Rouge refinery. Standard Oil of Ohio has laid plans to build a new refinery at Toledo. Union Oil Co. of California has completed a better than \$600,000 addition to its refinery at Edmonds, Washington to meet the ever increasing demands in the Northwest.

SOUTHERN PACIFIC Co. has awarded a contract to the Morrison-Knudsen Co., Inc., for a gigantic land-fill project which will come to a total cost of \$49 million. It will be a 13-mile fill across Great Salt Lake. The new embankment will replace a wooden trestle. First phase of the job will see 15 million cu. yds. of mud excavated from the lake bottom. About 31 1/2 million cu. yds. of fill will be used. Completion is expected about 1960.

NORTHERN NATURAL Gas Co. has asked the Alberta Petroleum and Natural Gas Conservation Board for permission to export 300 million cu. ft. of surplus gas per day from Alberta to the U.S. Texas Eastern Transmission Corporation has proposed a \$150 million pipeline expansion, a 30-in. line running from Beaumont, Texas to the Mexican border, near McAllen, Texas. The American Natural Gas Company has revealed plans to increase its delivery capacity. The line is now under con-

To keep tight towing schedules

LACKAWANNA R.R. PICKS 5 GM

TURBOCHARGED DIESEL-POWERED TUGS

The first five standardized tugs designed to the specifications of the railroad General Managers Association of New York—all powered by General Motors Turbocharged Diesels—have been ordered by the Delaware, Lackawanna and Western Railroad to tow car floats and barges in New York Harbor. Turbocharging gives a GM Diesel 75% more power with virtually no increase in engine size and a big reduction in weight per horsepower. And horsepower for horsepower, a GM Turbocharged Diesel costs less to install, run and maintain. Whatever your power needs may be—tugs, tankers, towboats, dredges, cargo ships or any other application—you'll have a better investment if you specify a GM Turbocharged Diesel. Your local Cleveland Diesel Engine Division representative can give you the facts—or write direct for more information.



A standardized design of the railroad General Managers Association of New York. Built by Bethlehem Steel Company Shipbuilding Division, Staten Island Yard, New York.

CLEVELAND DIESEL

An Engine Division of General Motors • Cleveland 11, Ohio



SALES AND SERVICE OFFICES:

Boston, Mass., 9 Commercial Ave.
Cambridge, Mass. Tel.: Eliot 4-7891
Chicago, Ill., 216 West Potomac Ave.,
Lombard, Ill. Tel.: Randolph 6-9214
Dallas, Texas, 9404 Waterview Road
Tel.: Fairdale 2403
Honolulu, T. H., 3115 Diamond Head
Road. Tel.: Honolulu 99-9202
Miami, Fla., 2315 N. W. 14th Street
Tel.: 64-2852
New Orleans, La., 727 Baronne St.
Tel.: Magnolia 6761
New York, N. Y., 10 East 40th Street
Tel.: Murray Hill 3-4372
Norfolk, Va., 554 Front Street
Tel.: Madison 2-7147

Orange, Texas, 212 First Street
Tel.: Orange 5-4226
Pittsburgh, Pa., 469 Martin Drive
Tel.: Locust 1-2173
Portland, Ore., 1676 S. E. Martin St.
Tel.: Prospect 1-7509
St. Louis, Mo., 2 N. Wharf St.
Tel.: Main 1-0642
San Diego, Calif., 3880 Sequoia Street
Tel.: Hutton 8-6883
San Francisco, Calif., 870 Harrison St.
Tel.: Douglas 2-1931
Seattle, Wash., 1230 Westlake Ave. N.
Tel.: Adler 1440
Wilmington, Calif., 433 Marine
Avenue. Tel.: Terminal 4-4098

CLEVELAND
DIESEL

struction from Louisiana to Michigan and is half completed. Delivery will be underway for the coming winter season.

FLORIDA POWER CORPORATION has laid plans to burn natural gas instead of coal in four of its generating plants. Construction of natural gas pipelines to Florida has made this clean fuel much cheaper than the coal which must be hauled in.

THE THIRD of the four lightweight trains which have received considerable publicity during the past year, Pullman-Standard's Train X, has been delivered to The New York, New Haven and Hartford RR. Power is provided by a German-designed diesel built by Baldwin-Lima-Hamilton. The Aerotrain and Jet Rocket, two other lightweights introduced earlier both have GM locomotives. Still to be introduced is the Budd Company's Tubular Train.

NINE DIFFERENT diesel-electric locomotives which General Electric states can be used on almost any railroad have been developed by the company for the overseas market. There are five sizes ranging from 400 to 1,980 hp.

THE MISSOURI PACIFIC Railroad has moved out of bankruptcy. It is the last major line to be handed back to its owners. It ends an era that began in the thirties with the bankruptcy epidemic. In good measure, the return of most lines to healthier business operations is a tribute to the new economical equipment, chiefly the diesel motive power which replaced the steam locomotive operations.

BY WAY OF illustration, "Old No. 7" a freight engine operated by the Norfolk and Western Railway, has been retired. The 60-year-old coal burner has been moved to the Bluefield, West Virginia fairgrounds to serve as a monument to the passing of an era.

"Hidden Dollar Costs Endanger Free Interstate Commerce Flow"

Free flow of interstate commerce—essential to the nation's economy—is seriously endangered by existing and potential "hidden dollar" costs in highway transportation, an executive of Mack Trucks, Inc., asserted here recently. Albert G. Crockett, director of sales development of one of the nation's largest producers of heavy-duty commercial vehicles, told the Springfield Chapter of the National Association of Cost Accountants that they have an obligation to pinpoint and help try to correct "hidden dollar" costs of doing business which result from onerous, over-lapping highway regulations and obsolete highways.

West Coast Office

Construction will start in May on a new Los Angeles engineering and sales office for The Liquidometer Corp., Long Island City, N. Y. Completion is expected in September of this year. The new one-story building at Santa Monica Blvd. and Harper Ave. will have 4,500 sq. ft. of floor space and will be com-

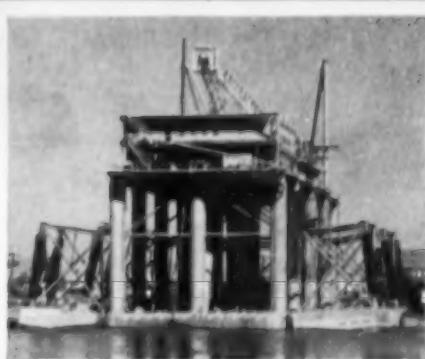
pletely air conditioned. Liquidometer will equip the plant with the latest test equipment for overhaul and repair of its line of industrial and aircraft liquid gaging instruments.

Dravo Director

Charles E. Walker, vice president personnel and public relations of Dravo Corporation, has been elected to the

company's board of directors, it was announced recently. Mr. Walker joined Dravo in 1933 as a member of the accounting department. He successively held positions of assistant secretary, assistant treasurer, auditor and secretary.

He became director of industrial relations in 1946 and was elected vice president in 1949.

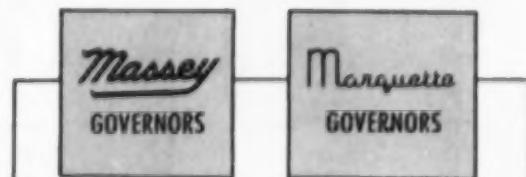


Marquette GOVERNORS regulate diesel engines on submersible drilling barge

American Tidelands Barge "101" is designed to drill for oil and gas beneath the waters of the Gulf of Mexico.

After being towed to location, the barge is flooded with sea water and settles to the floor of the ocean, held in place by its own weight and by the stabilizing pontoons at each side. The two-story superstructure, supported on 52 ft. columns, houses the machinery, drilling equipment and crew.

The rig's main power comes from a battery of five GM Cleveland Diesels, regulated by Marquette Hydraulic Governors.



Engineering facilities and service agencies for Massey and Marquette Governors are at your disposal for all problems of governing and control.



Florida Diesel News

By Ed Dennis

TWO ENTERPRISE diesel generating sets to be installed in two dredges by Dade Drydock. Each are model DSM 361 rated 365 hp. with 312 KVA Colum-

bia generators, Woodward UG8 governors, Ingersoll-Rand air starters and Brown-Boveri exhaust gas driven turbo-chargers.

CAPELETTI BROS. of Hialeah, paving contractors, took delivery of a 6 yd. Tournapull scraper powered with a 6 cyl. JBS Cummins diesel rated 150 hp., Delco-Remy starters and generators.

FROM FLORIDA Georgia Tractor Co., Miami, a model 95 Northwest dragline with a model 21 Murphy diesel for Fern Crest Mining Co. of Hollywood and a 41 Northwest dragline with a #12 Murphy for the City of Ft. Pierce.

A 5 HP. PETTER diesel to power the Winpower generator on the newly launched *Pamscott* of Tampa. Main

propulsion is a D337 Caterpillar diesel. Harold Nelson is the owner.

AN ALLIS-CHALMERS HD9 two yd. side loader powered with a GM 4-71 diesel, clearing ground for new facilities at Miami International Airport to cost approximately \$209,000, contractors are Collie A. Clark & Co.

RECENT DIESEL ENGINE Sales Inc., launchings included two 67 ft. shrimp trawlers. The *Night Hawk* and *Sugar Daddy* both powered with D342 Caterpillar diesels for the Versaggi Shrimp Co. of Tampa. They also sold a D337-F Caterpillar for the 72 ft. *Lady Bell* of St. Mary's, Ga.

MURPHY DIESEL CO. has approved the Morehead City Shipbuilding Co. as its marine dealer in North and South Carolina. Mr. Leslie Vickers, Jr. will be in charge of sales and service. The firm will also sell Murphy diesel generating sets.

A RECENT General Motors installation was made in the newly launched *Miss Muse* with a GM 6-110 plus GM 4.5:1 r/r gears, Jabsco pumps and a 52 x 40 Columbian 4 blade propeller; a sister ship to the *Miss Pamlico*.

FOUR BUDA diesel generating sets for the Melbourne Air Force Base. Six cylinders, model DCG1879, they power 100 kw. Allis-Chalmers generators.

The *King Chesapeake*, a 112 ft. Fairmiler ex-British navy patrol vessel, was repowered from gasoline to two General Motors 6-71 diesels with 3:1 GM r/r gears, also included was a 2 kw. Onan diesel generating set.

A #315 GYRO-FLO Ingersoll-Rand rotary mobile air drill powered by a General Motors 3-71 diesel for Capelitti Bros., Hialeah. Also included on this air drill rig is an Air Glide regulator for the air compressor and a Donalson air breather. It is used in dynamiting operations.

THE SEABOARD Railroad has ordered 25 diesel electric switching locomotives. Each rated 1750 hp. and costing approximately \$4,000,000, from the Electro-Motive Div. of General Motors Corp.

THE EAST COAST Hatching Egg Express, which runs from Chester, N. H. to Miami, has a new Mack B61 dieselize highway tractor powered with the new Mack 6 cyl. Thermodyne diesel engine, Bosh injectors and Woodward governor. The special hatching eggs are then shipped via P.A.A. Cargo Clipper to Cuba.

Commercial Filters Corporation acquires Honan-Crane and Michiana



Three famous names
in filtration
now united
for greater service to industry...



A FILTER FOR EVERY PURPOSE

Honan-Crane Oil Filters featuring a wide selection of interchangeable cartridges plus several types of bulk refill materials to provide "selective filtration" . . . exactly suited to your requirements.

Fulflo Filters in all sizes for ultra-high flow rates with lowest pressure drop. Low cost, long-lasting Honeycomb Filter Tubes give true depth filtration in a wide range of precision-controlled densities for any desired degree of micronic filtration.

Michiana Lube and Fuel Oil Filters for diesel and gas engine service. Available in a wide selection of types and sizes.

1. Commercial FULFLO Filters and Honeycomb Filter Tubes . . . the original controlled density element for full flow liquid filtration.
2. HONAN-CRANE Filters with bulk or cartridge filter elements, and CFC Pre-Coat Filters, Magnetic Separators, Coolant Clarifiers and Tubular Conveyors.
3. MICHIANA Lube and Fuel Oil Filters for diesel and gas engines.

The addition of Honan-Crane and Michiana enables Commercial to offer you the nation's most extensive line of filters for industrial use. Fulflo Filters and Honeycomb Filter Tubes will be manufactured exclusively at Commercial's modern plant in Melrose, Massachusetts. A newly-formed Lebanon, Indiana subsidiary—Indiana Commercial Filters Corporation—will be devoted to the production of Honan-Crane, Michiana and CFC equipment.

The expanded Commercial Filters organization represents a combined total of 70 years' experience in the industrial filtration field. This wealth of experience is available on any phase of your filtration program.

DISTRICT OFFICES—
New York • Chicago • Memphis
Sales and Service Representatives in more than 30
principal cities

plants at:
Melrose, Massachusetts
and Lebanon, Indiana

COMMERCIAL FILTERS CORPORATION

THE *Inagua Rover*, a 140 ft. freighter designed especially for island hopping in the West Indies by Dade Drydock Co., and owned by West Indies Shipping Co., was recently launched. Specifications called for two D375 Caterpillar diesels rated 300 hp. each plus two 19 KVA Caterpillar generating sets with Schwartz-Cummins air cranking motors.

D. P. GOSHEFF was appointed sales representative of the Detroit Diesel Engine Div. of General Motors Corp., Florida Branch. He will coordinate the diesel sales activities of the Florida marine and industrial dealers with operations at the Jacksonville and Miami headquarters.

CUMMINS Diesel Engines, of Florida, repowered two hiway tractors. One a JTS at 180 hp. in a White for Charles Fortenberg of Homestead and a similar installation in a Reo for J. B. Webb of Hollywood.

WHALE CAY in the Berry Islands, and owned by Betty Carstairs, received two General Motors 4-71 diesels to power two 40 kw. Westinghouse generators from Ellis Diesel Engine Sales of Ft. Lauderdale, Miss. Marion (Betty) Carstairs, a British heiress, has established a successful agricultural colony on this island which prompted widespread stories representing her as an "Island Queen."

Addresses American Power Conference

"Power, the know-how to use it and a favorable political and governmental climate will take this nation and everyone in it to new heights of productivity and prosperity." R. S. Stevenson, president, Allis-Chalmers Mfg. Co., made this statement recently at the opening meeting of the eighteenth annual American Power Conference at the Sherman Hotel in Chicago.

Mr. Stevenson said that more than geography, racial mixture, advantage of natural resources and the fact that we are a "new" nation, enabled America to become the world's most powerful nation. "We have found a way to put mechanical horsepower, and all the machines that support and derive from it, to work to magnify our efforts," he said. "It has been calculated that we have more than six and one-half billion horsepower available to us—about 100 horsepower for every person gainfully employed. Only 150 million of these horsepower come from central station electric power but their value is equal to the productive energy of one and one-half billion men doing physical labor.

"However, it takes more than power and

machines to make our economy go. We'll have to have more people than ever to design, build and operate the machines. They will have to have more technical knowledge and skills than has been necessary heretofore." He expressed concern over the shortage of engineers and trained technicians and has little hope that the situation would change soon.

High Capacity Filter Design

A newly engineered, high capacity, simplified filter for diesel fuel and lube, pipelines, process liquids, water, gasoline and aviation fuels is described in the Cuno Engineering Catalog MK-170. This new filter is designed for flow rates up to 2000 gpm in a small space (2½ feet diameter by 4½ feet high) and to offer four degrees of filtration (50, 25, 10 and 5 microns) down to 1 micron. Fast, easy cartridge changes are main features of this design. Specifications, flow rates and engineering drawings are included in this four page catalog. The catalog is available from the Cuno Engineering Corporation.

"Working Model" of the Opposed-Piston Diesel YOURS FREE

The Dependable Opposed Piston Diesel Engine

1. Unusual flow of oil from or into cylinder from bypass through unique ports—improving efficiency because no complicated valves are used.
2. Oil can is extruded in the cylinder by the opposing piston parts, then sealing on intake ports. The precision casting of port clearing sections provides greater horsepower and increases thermal efficiency by the reduction in pressure-averaged economy.
3. Compressing air into the opposed cylinder. No cylinder formed by the two piston stems. Oil produces a SURFACE air charge.
4. Ignition of fuel injected into the SURFACE air charge. Is obtained by heat of compression. The resulting pressure ignites both piston compression produced enough horsepower power. Since engine piston stems are reversed in opposite directions, the forces are balanced—only minimum foundation are needed.
5. Power stroke developed is transmitted to low crankshaft, in explosion proof enclosures. TWO-SCREW bearings carry the power and protect crankshaft journals. NO BRIDGE power is developed in the normal power charge. Intense air pressure holds the oil by several degrees of combustion rotation.
6. Exhaust port operating along the cylinder bore, providing accelerated outlet for burned gases. In seeking of power by operating complicated port cuts, valve assemblies and valve mechanisms. His valves—no valve needles—no springs to break—no valves to grind.
7. Unique port openings provide constant air intake. Burner pressure to purge burned gases by the uniform scavenging system, thus all exhaust gases are swept out ahead of the fresh air flow in one direction through the cylinder. Again, modern two-cycle design with no valves provides higher operating efficiency.

SUMMARY:

Controlled attention to engineering design of each of the above phases that Allis-Chalmers has developed the OPOSED PISTON engine as a low first cost or fuel cost, low maintenance cost unit. All together these add up to a lowest cost. And—the simple mechanical principles make possible the modification of this engine to a dual fuel unit, or a high compression spark ignition unit, type vehicles for burning natural gas, sewage gas, commercial propane or propane tanks without sacrificing horsepower or economy.

Here in Graphic Full Color

is a detailed working model of the Fairbanks-Morse Opposed-Piston Diesel Engine—and it's yours free for the asking.

With the 8-inch operating cutaway in front of you, you can follow the complete operating cycle of this outstandingly successful heavy-duty engine designed for continuous service. Moving the disc at the right operates the model showing exact position of pistons, and color codes condition in the cylinder, throughout the entire cycle of events.

You'll also see the simplicity of the O-P that has no valves, intricate valve trains,

cylinder heads and gaskets—in fact, it has 40% fewer moving—wearing—parts than any comparable engine of equal horsepower.

If you are interested in dependable power with low operating and maintenance cost, send for your working model of the O-P diesel today! Simply attach this advertisement to your letterhead (or ask for O-P "Working Model") and send to Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Illinois.

 **FAIRBANKS-MORSE**
a name worth remembering when you want the BEST

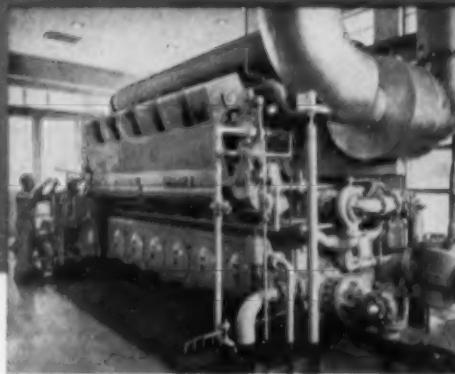
DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES
RAIL CARS • ELECTRICAL MACHINERY • PUMPS • SCALERS
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**DE LAVAL
HIGH PRESSURE
TURBOCHARGERS**

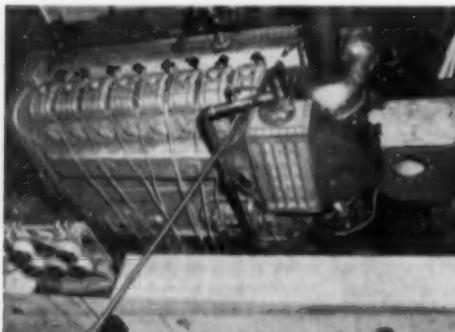
*increase output
by 100% or more*

- Rotor is constructed entirely of alloy steels.
- Turbine blades and turbine hub, made from a highly heat-resisting alloy, are an integral structure. This provides the highest possible safety factor.
- Turbine rotor is air-cooled, for safe operation with any temperature encountered in reciprocating engine service.
- Design of all flow passages minimizes possibility of clogging.

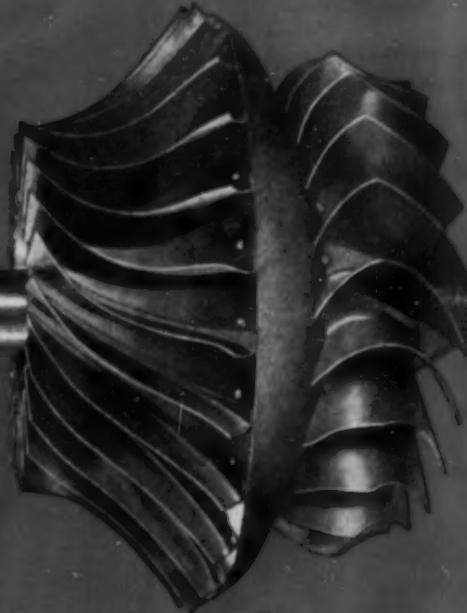
- Turbine nozzle box or turbine housing is not water-cooled. Thus there is only negligible heat rejection to engine cooling system.
- Turbine nozzle guide vanes are adjustable, so that turbocharger can be exactly matched to engine.
- Shaft end is free for driving lubricating system, tachometer and other accessories.



Here is a De Laval Type A-14 Turbocharger installed on a V 12-cylinder, 4-cycle diesel engine.



A De Laval Type B-B Turbocharger, shown on test, is mounted vertically on an 8-cylinder, 2-cycle diesel.



*Exclusive
MONOROTOR
construction shows why*

These De Laval high pressure turbochargers represent the newest development in diesel engine design. In many cases they can double the output of heavy-duty diesel, gas and dual-fuel engines without increasing thermal loading. • They offer pressure ratios of 3:1 as well as far higher compressor and turbine efficiencies than those found in conventional turbocharger systems. • De Laval turbochargers are self-adjusting to engine loads, can be used on 4- and 2-cycle engines. Write for Bulletin 8000 giving compressor curves and flow range diagrams.

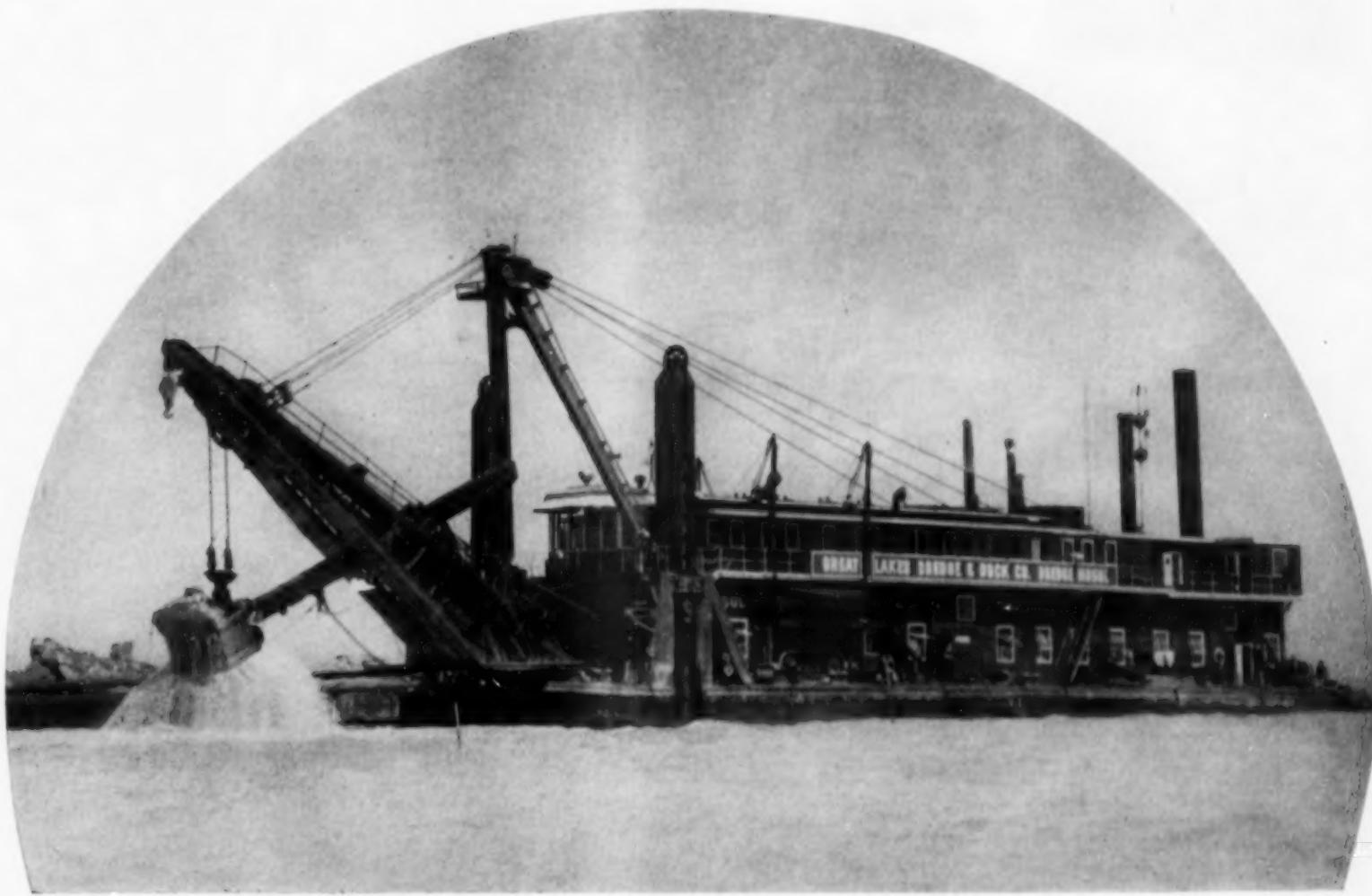


DE LAVAL

Turbochargers

DE LAVAL STEAM TURBINE COMPANY
883 Nottingham Way, Trenton 2, New Jersey

DL288



Recently repowered with a Nordberg Supairthermal engine, the Great Lakes Dredge & Dock Company Dredge *Mogul* raises 12 cubic yards of mud from the bottom and places it in its attendant dump scow. The dredge is the largest, most powerful dipper dredge on the Great Lakes.

GIANT DIESEL DREDGE "MOGUL"

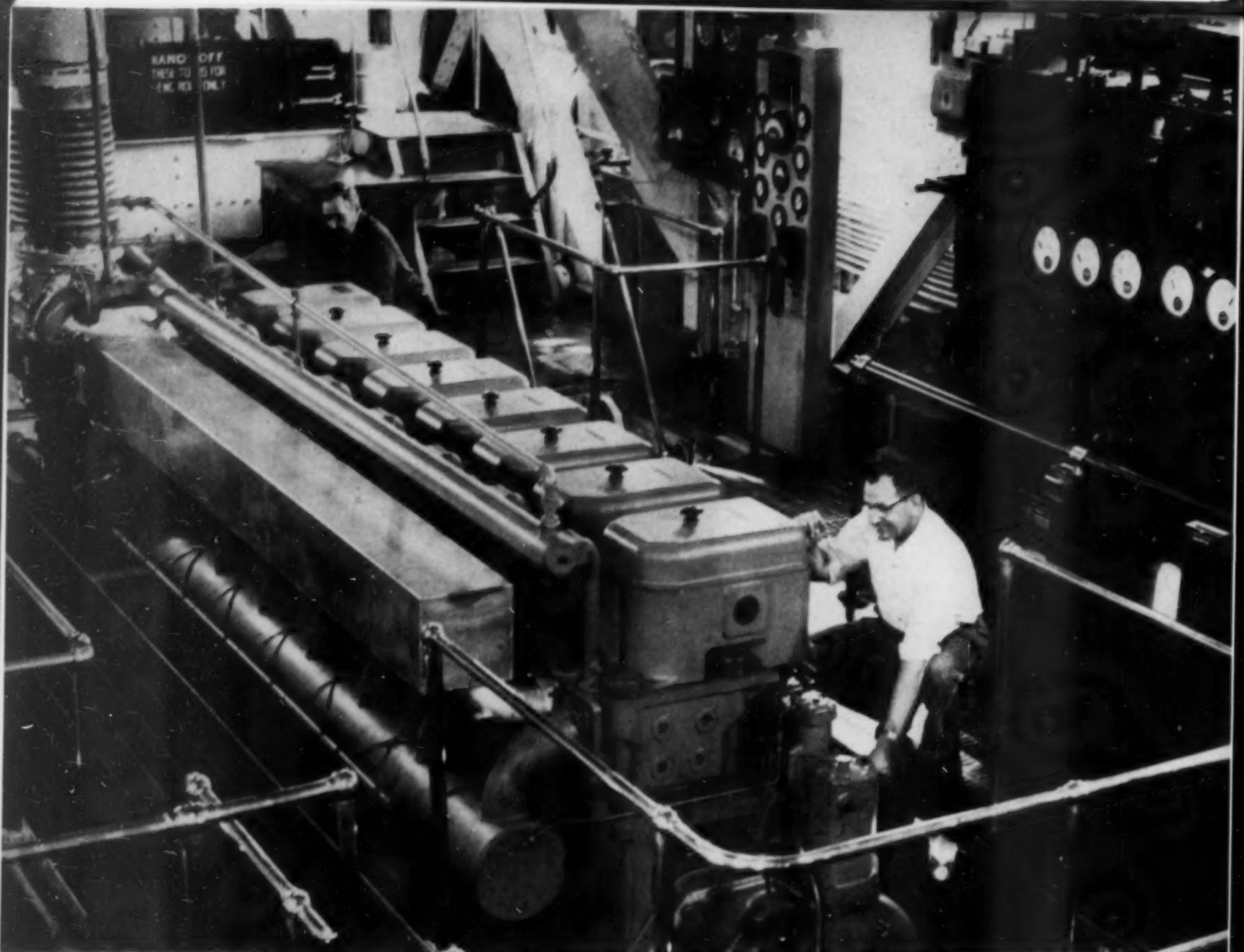
By DWIGHT ROBISON

IF YOU could be a "sidewalk superintendent" along the St. Lawrence Navigation project, you would certainly stop to watch with amazement the powerful, working action of the Great Lakes Dredge and Dock Company Dredge *Mogul*. This dipper dredge is like a three legged giant, slowly wading down the St. Lawrence while taking 12 cubic yard bites out of the river bed. The heart of the *Mogul* is its diesel plant. All major machinery draws its power from one of the four generators which are direct connected in tandem to the main engine. The main hoist, the thrust, swing and backing machinery, two forward spuds and the stern or walking spud and the deck winches are all powered by electric motors.

With each complete digging cycle, the engine is put through a terrific test. In a matter of seconds, the engine must go from no load to approximately full load. Full load is maintained for about seven seconds during the hoisting operation and then drops off sharply as the bucket is swung over the scow for dumping. One-half load is again required when hoisting the bucket up from the scow and swinging back for relowering to the river bed. The entire cycle takes only 62 seconds, during which time the engine must take an unusual number of decided swings.

The Dredge *Mogul* had relied on an eight cylinder Busch-Sulzer engine for 25 years. This two-cycle

engine was installed in 1929 and established an enviable record for reliable service under these rugged operating conditions. Since the end of World War II however, the engine had begun to show its age. Work at Atlantic coast Navy Bases without the benefits of a closed cooling water system, had shortened the effective life of the engine. Today, the heart of the *Mogul* is a Nordberg Supairthermal in-line engine with eight cylinders of 15-in. bore and 16½ in. stroke. Both the old engine and the new Nordberg are eight cylinder diesels, rated 1100 hp at 300 rpm. Here the similarity ends. For this dredging application, the four-cycle Supairthermal engine, being ideally suited to handle wildly fluctuating load conditions, has



Chief Engineer John Hoynosh sets the Woodward governor of new Nordberg in-line engine which has eight cylinders of 13" bore and 16½" stroke, while Merlin Taylor, one of his assistants, is ready to make any minor adjustments. The auxiliary gauge board, Nordberg engine gauge board and hoist switchboard can also be seen (L to R) along the port side bulkhead.

more than successfully replaced the Busch-Sulzer two-cycle unit.

The previous troublesome problem of exhaust silencer fires, sometimes familiar to operators of two-cycle equipment under varying load conditions, caused Great Lakes Dredge & Dock Company to consider replacing the existing exhaust silencers with stainless steel units. The trouble-free performance of the Nordberg four-cycle unit however, made this addition expense unnecessary.

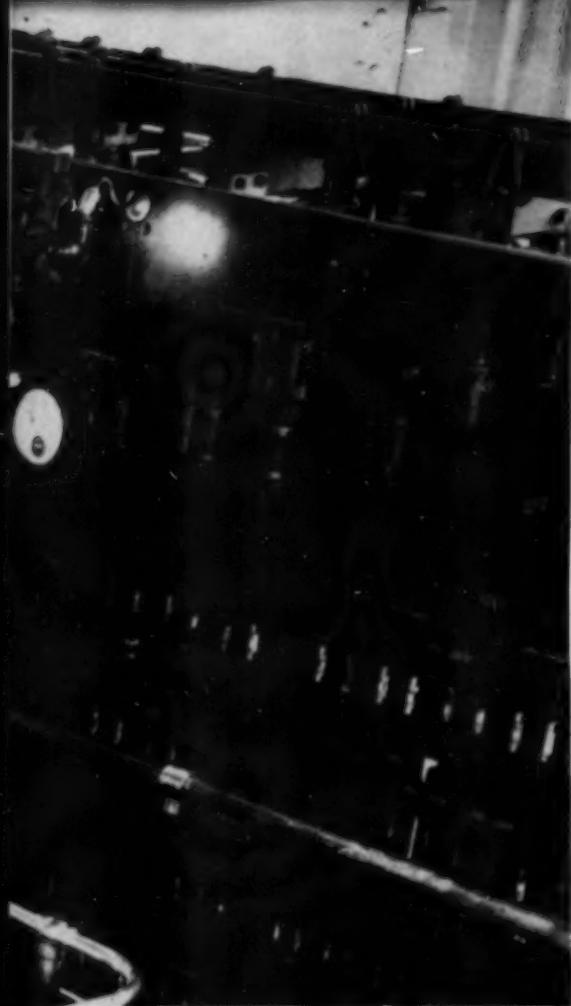
The new Nordberg is 6 ft. 10½-in. shorter than the old engine and thus 477 cu. ft. of valuable engine room space was made available with no sacrifice in power, in fact the new engine is normally rated 1600-2130 bhp at 450-600 rpm, so the *Mogul* has plenty of installed reserve power if the generators are ever increased above their present 300 rpm limit. The cylinders of the two-cycle Busch-Sulzer engine were 14½ x 18-in. and the unit developed 59 lbs. bmeep as compared to 13 x 16½-in. for the Supairthermal engine which de-

velops 166 lbs. bmeep. These comparisons illustrate the engineering advances that have been made in building compact engines to provide efficient, dependable power.

Performance data received from Chief Engineer John Hoynosh reveals other interesting comparative figures. Fuel oil consumption has decreased 37 per cent. Under normal operating conditions, fuel consumption for an eight hour working day has dropped from 240 to 150 gal. Consumption of lubrication oil by the new four-cycle Nordberg has also decreased by a considerable amount as compared with the requirements of the old engine and "Smoking Black" is a cry which is no longer heard aboard the *Mogul*. The dredge has a total fuel capacity of 90,000 gallons. Two 15,000 gallon and two 7500 gallon tanks are located on each side of the double bottomed dredge. The No. 2 diesel fuel is held in a 700 gallon day tank on the main deck level before it passes through a duplex strainer and is drawn through a low pressure strainer to the fuel manifold by a low pressure

pump. Individual high pressure fuel pumps for each cylinder then force the fuel through the fuel injection nozzles.

An Elliott turbocharger, with a pressure ratio of 1.9, supplies air to the intake air manifold of the Nordberg Supairthermal engine at 12 psig. The turbocharger has an independent lubrication system which is protected by both high temperature and low pressure alarms. The lube oil passes through a strainer before being pumped through a cooler and Nugent filters to the turbocharger and back to the supply tank. A Fulton-Syphon regulator will cut in the engine lube oil if the turbocharger's independent system fails. Two engine lube oil pumps are alternated on a regular schedule. The oil is pumped from an 800 gal. sump through a full flow oil filter and a cooler before passing through a 30 mesh duplex strainer. After lubrication of the engine, the oil travels forward to lubricate the drive shaft bearings of the main hoist drum and then return to the sump located beneath the base of the Nordberg engine.



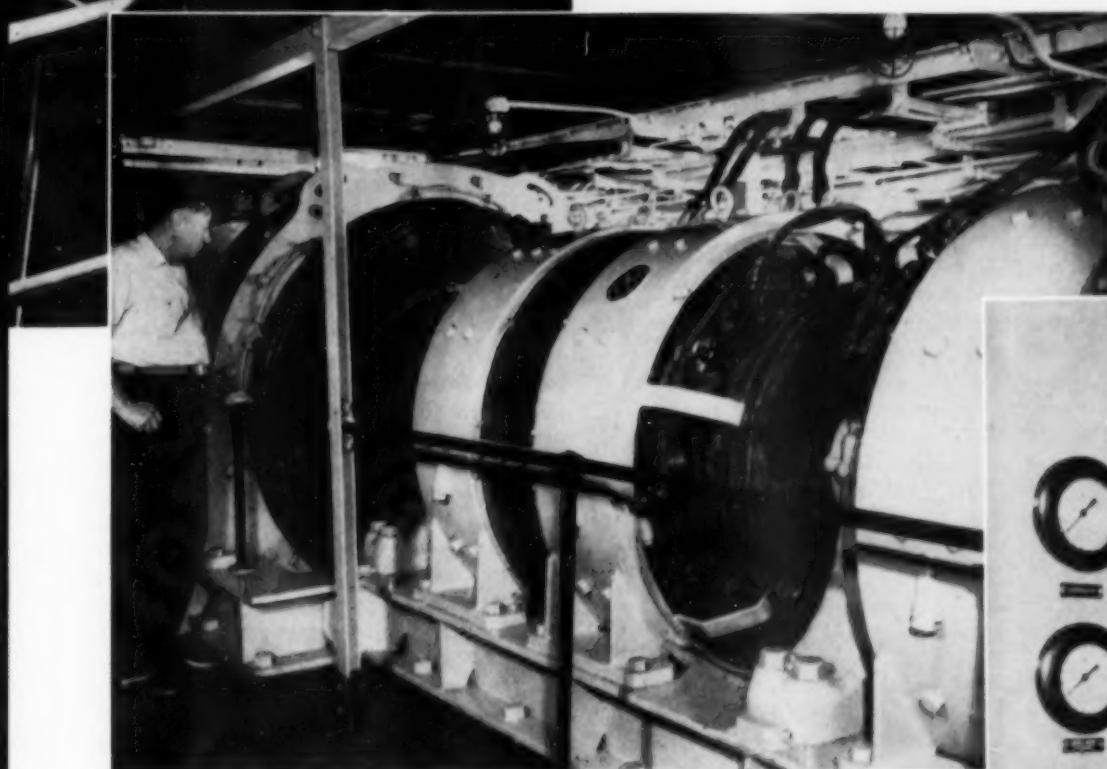
While the *Mogul* was being repowered at the Knudsen Bros. Shipbuilding & Drydock Company, Superior, Wisconsin, the generator shaft, flywheel and inboard bearings weighing 10 tons were pulled and sent to Nordberg's St. Louis, Mo. plant for reconditioning. This added service included re-polishing the shaft and rebabbitting the bearings. The Nordberg Supairthermal engine drives four direct current generators through a Falk flexible coupling. A 300 kw generator furnishes power to two 187½ hp motors that raise and lower the main hoist by a single differential drum grooved for twin 2-in. diameter cables. The movement of the dipper handle in and out is by means of a motor-driven pinion operating on a rack attached to the handle.

The operation of this thrust machinery determines the digging depth and helps to position the bucket over the dump scow. The swing of the hoist is controlled through a 24' diameter circle by a single 35-in. diameter grooved drum. Both machines are powered by 75 hp motors which draw their power from two 75 kw generators. The backing machine which pulls the bucket under the front of the hull on the digging stroke and the motors which lower the spuds to support the hull and hold it in place during digging operations and other auxiliaries draw power from the 4th generator, rated 100 kw.

The *Mogul* is the largest and most powerful dipper dredge on the Great Lakes. It has a length of 156

ft. and beam of 42½ feet. The Bucyrus-Erie Company and Manitowoc Shipbuilding Company designed and built the dredge at Manitowoc, Wisconsin in 1929. The boom is 60 ft. long and carries a 59 ft. or a 69 ft. long handle, depending upon the dredging job. The working depth of the dredge is from 18 ft. minimum to a maximum of about 50 feet. Several different buckets are used varying from an 8 yard rock bucket to a 12 yard mud bucket. The *Mogul* has dug more than 19,000 cubic yards in one 24 hour day and its main hoist exerts a total bail pull of 150 tons. Because of these outstanding performance capabilities, the Dredge *Mogul* is assigned the toughest jobs on the Great Lakes. Since its repowering during the summer of 1955, the *Mogul* dug a 13-ft. deep trench for a distance of 6000 ft. out into Lake Michigan from a point several miles north of Kewaunee, Wisconsin. The growing City of Green Bay will lay pipe out to an intake crib and pump water to a filtration plant located several miles inland.

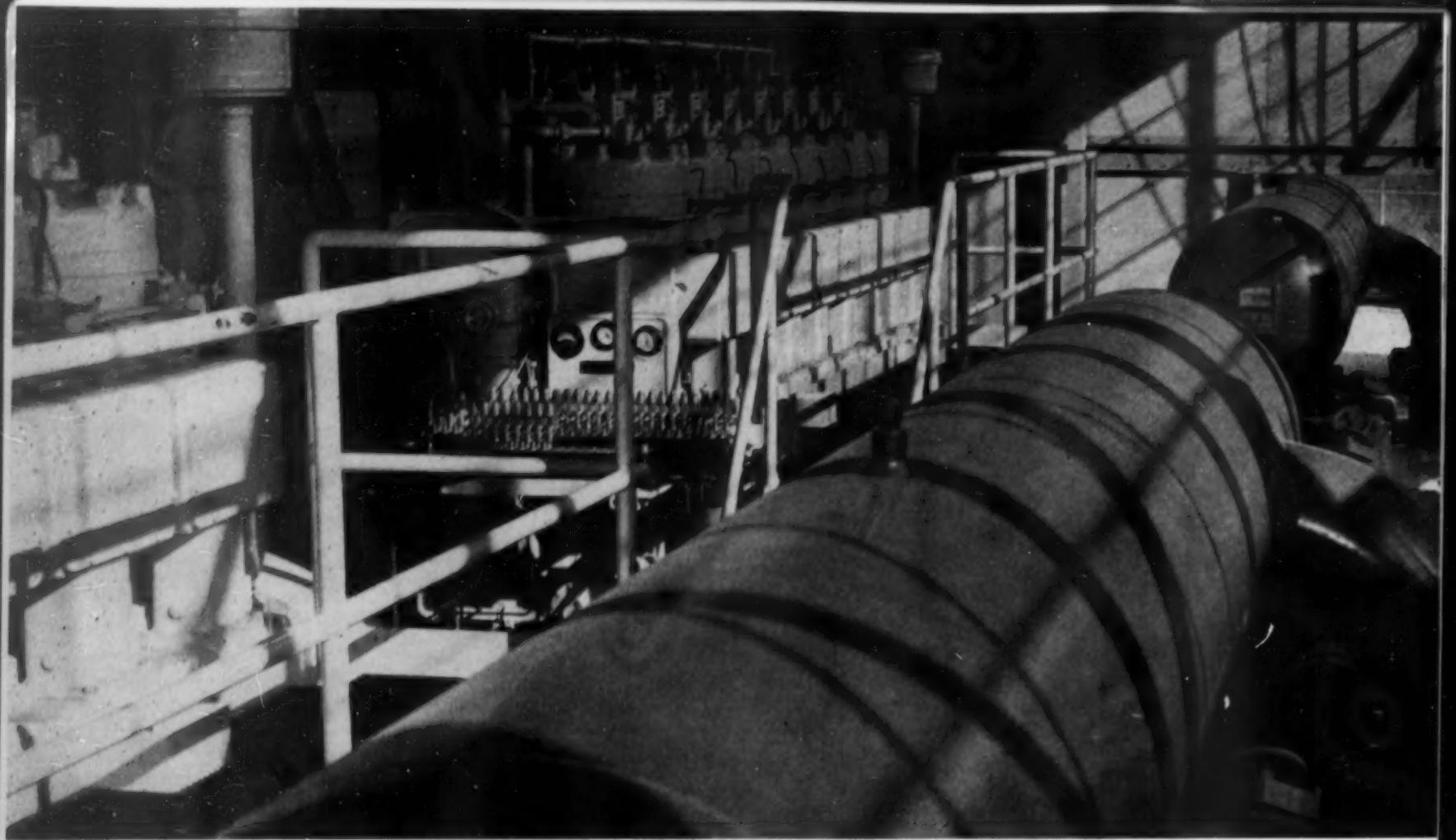
The *Mogul* is now a part of the tremendous construction force at work on the St. Lawrence Navigation Project. Working near Ogdensburg, New York, the *Mogul* must dig 1,000,000 yards of clay and 1,000,000 yards of boulders and rock for the new channel in the Chimney Island area. The Great Lakes are being opened up! When completed, the St. Lawrence Seaway will accommodate ships of 26 ft. draft. Ports in New York, Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota can then be reached by over 90 per cent of today's ocean-going ships. The Great Lakes Dredge & Dock Company anticipated the heavy work load that would result when the Seaway project was undertaken and the repowered *Mogul* is ready to do the job along the St. Lawrence and in the many Great Lakes harbors that will be deepened. Her compact Nordberg Supairthermal engine is engineered to meet the test of each digging cycle for round the clock operations.



Four 300 rpm General Electric generators are arranged in tandem and driven by the Nordberg Supairthermal engine. One 300 kw, two 75 kw and one 100 kw generator supply power to the hoist, swing and auxiliary machinery, respectively.

The Nordberg gauge board contains a Weston repeating tachometer, Alnor pyrometer and Meriam vacuum gauge in addition to the controls for the crankcase vacuum pump and the turbocharger lube oil pump.





Interior of the Moreno pumping station showing the compressors and the two Clark engines. Note the McCord lubricators.

MORENO PUMPING STATION

By JAMES JOSEPH

TWO 1100 hp gas-fired engines driving compressors . . . a complex controls system which allows one-man operation . . . expansibly designed for "add-on" units . . . that's San Diego Gas and Electric's Moreno compressor station which ups delivery capacity of the utility's 16-incher to 112 mmcfd/day. Moreno, completed in December, cost \$800,000, works two 1100 hp gas-driven compressors, rated 450-psig suction, 650-psig discharge. Moreover, it's designed for single-handed operation, around the clock. The station lies athwart 85-mile long, 16-inch transmission line which junctions with Southern Counties Gas Co.'s "big inch" bringing natural gas from Texas.

Aside from one-man operation, the station is rigged with: (1) a single piping loop cooling both engine jacket water and lube oil, a savings of some \$5000 in piping alone; (2) isolated control room and auxiliary buildings eliminating need for explosion-proof switchgear in these areas; (3) fuel gas take-off from the discharge line, reducing formation of hydrates. Physically, the Moreno station lies in Riverside county, along the 16-inch line, and only a quarter mile south of its junction with Southern Counties' 30-inch. Thirty-five miles south of Moreno is San Diego Gas and Electric's

Rainbow compressor station, whose two 880 hp gas-engine driven compressors delivered a maximum 83 mmcfd/day, at a suction of 300 psig, a discharge pressure of 460 psig. Now, with Moreno hooked into the line, the 16-inch's delivery will be substantially increased, thanks to higher compression. Just as important, the 16-inch now becomes a "storage" line of far greater capacity.

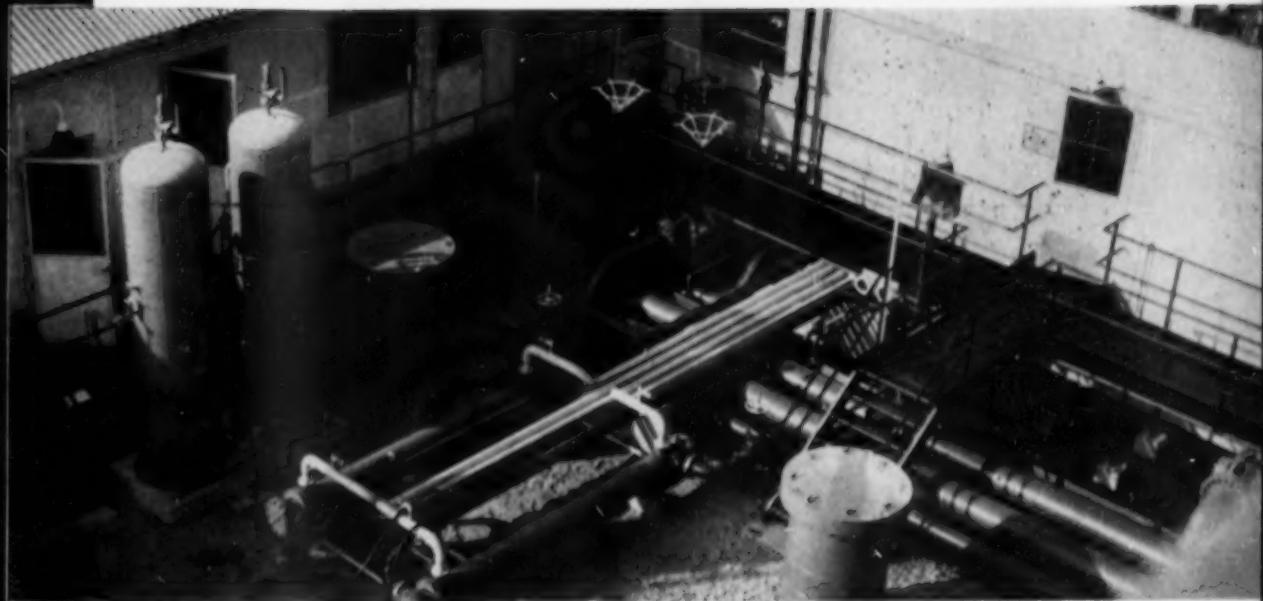
All this is indicative of San Diego's growth and its need for natural gas. Before 1952, the 16-inch was delivering at normal pipeline pressures, without additional compression. Capacity then was a meager 40 mmcfd/day. In 1952, Rainbow went on the line, upping delivery to 83 mmcfd/day. Now Moreno has become operative, compressing gas still further, and upping by another 29 mmcfd/day San Diego's delivery. Moreno's prime-movers are the two Clark 1100 hp, supercharged, gas engines which drive Clark compressors. Engines are 2-cycle and "right angle," with 8 power and 4 compressor cylinders. Engines have a stroke of 14, a bore of 14-inches. The 12½-inch compressor cylinders have a manual lift valve at each end, and a clearance pocket on their outboard ends.

Engine-compressors are bedded in a compressor

house that's physically isolated from the station's office, maintenance facility and from the gas-driven Waukesha engine which takes over in case of electrical failure. The standby delivers 150 kw via a synchronous generator. Isolation from main compressors eliminates need for explosion-proof switchgear in this area which is a considerable saving. In operation, the 16-inch transmission line is tapped by a 16-inch header, which branches to a 12 and 16-inch line, feeding gas to scrubbers. A 12-inch line, if desired, can by-pass the scrubbers.

Gas is scrubbed through two, oil-type Blaw-Knox units, both 60-inches diameter and 17 ft. high, working at a maximum 1000 psi. From scrubbers, a 16-inch suction header feeds the compressors, while a 12-inch header is tapped for fuel gas operating compressor engines and the emergency Waukesha electric plant. Compressed gas routes to a Fluor cooling tower, entering at 125-130 degrees F., exiting cooled to about 95-degrees. Gas then reenters the 16-inch line for transmission to the Rainbow station and eventually to San Diego.

Incoming Texas gas arrives at Moreno at approx. 60-degrees F., and since it exits at 95-degrees, the compression heat increase is only about 35-degrees.



Exterior of the pump house showing the air starting tanks, the Air-Maze air filters, lube oil and engine jacket water cooling system.

not enough to affect either the transmission line's growth nor its asphalt wrapping.

Compressor house: each HSRA-8 Clark, 1100 hp gas engine drives a Clark 14 x 12½-inch compressor. Compressors' suction bottles work at a maximum 850 psi, a max. temp. of 651-degrees, are 30-inch OD by nearly 16-ft. (bottles built by Southwest Welding and Mfg. Co.). Engines are lubed by McCord force feed lubricators, the oil processed thru Fram filters. Engine safety controls are by Robertshaw Fulton.

Jacket-water cooling is thru a closed system It is one which Fluor and San Diego Gas & Electric's engineers believe to be the ultimate in efficiency. As a matter of fact, the single loop system so short-cuts piping that it helped the utility to save an approximate \$5000 on piping costs. Essentially, water jacket cooling involves two Ingersoll Rand 600 gpm at 1760 rpm pumps, driven by 20 hp GE induction motors. The same line which carries jacket water also cools lube oil. An 8-inch line runs to the Fluor cooling tower, where jacket water drops about 10-degrees (from 140-degrees to 130). A Fisher valve and regulator can, particularly on engine start up, by-pass the cooling tower (when engine water is cooler than say 130-degrees F.). The single loop continues its circuit to the lube oil coolers (mounted outside the compressor building). Jacket water entering coolers at 130-degrees picks up two degrees, dropping lube oil from 160-degrees to 140-degrees. Thus, jacket water, exiting engines at 142-degrees, returns ten degrees cooler—132-degrees. This closed circuit is linked to a surge tank. Make-up water is treated.

In the isolated auxiliary room are also located two engine-start air compressors, Gardner-Denver ADS,

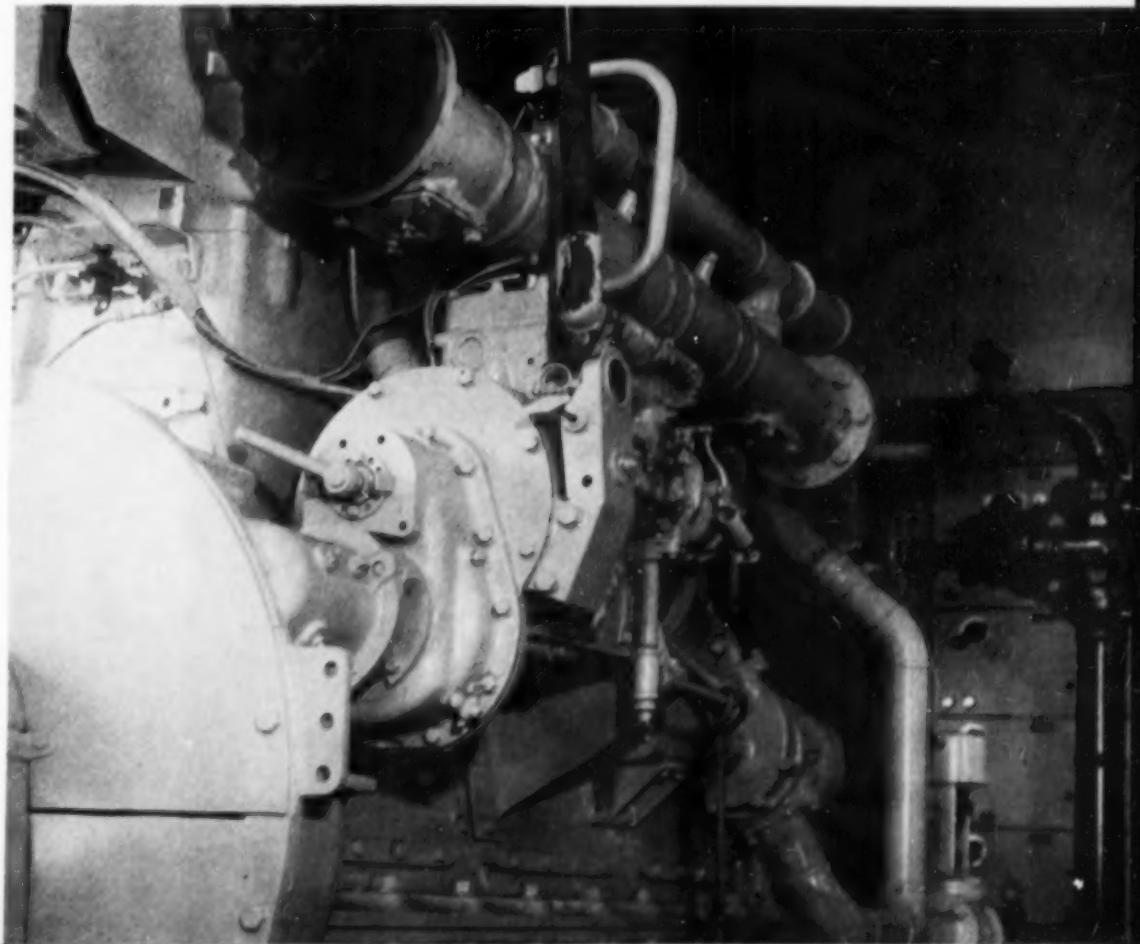
two-stage, V-type air cooled units, driven by 10 hp. Century electric motors. Compressors work at 870 rpm, with a maximum 250 psig and a capacity of 31 scfm. Compressors have a bore of 5½-inches, a stroke of 4-inches. Air start system's two storage tanks stand 10-ft. high and are 36-inches od, with a max. 275 psi working pressure. Combustion air is filtered through two Air-Maze oil bath filters, located exteriorly of the compressor house, as are the lube oil coolers.

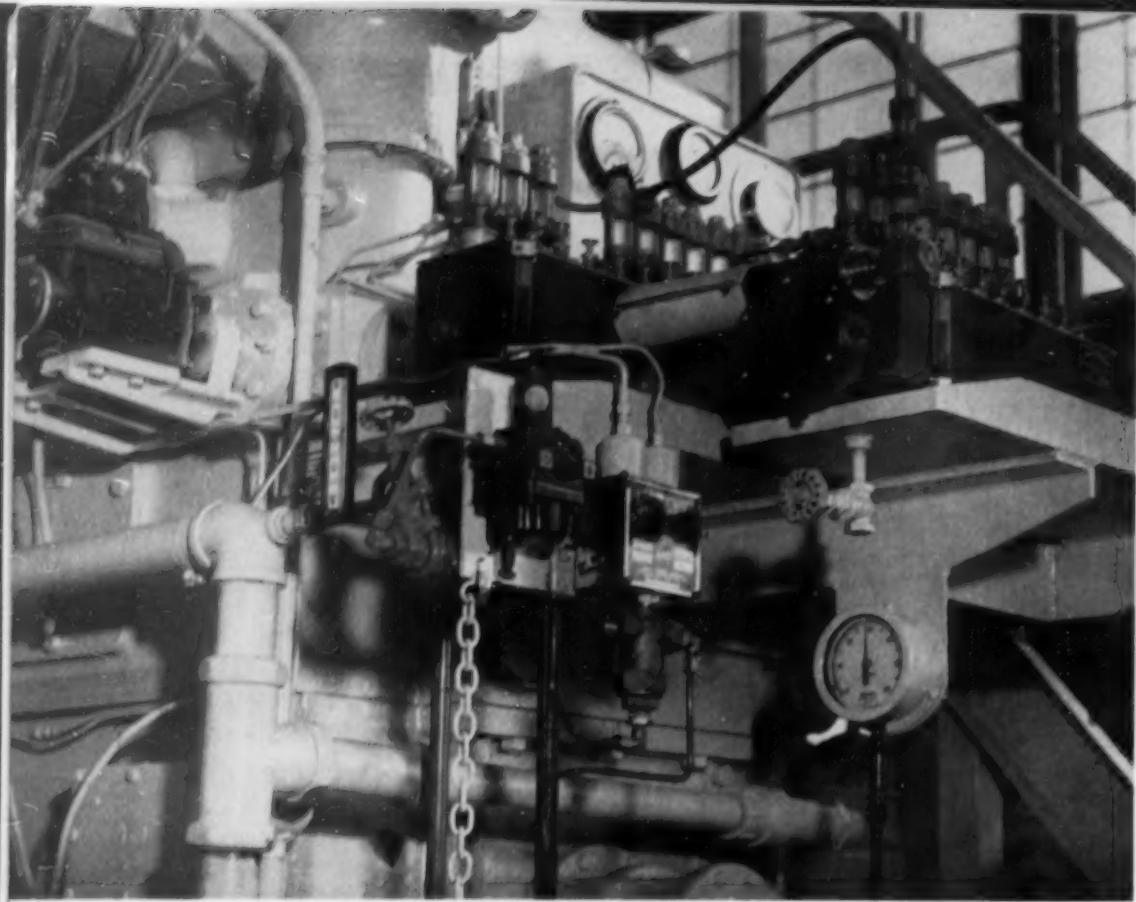
Auxiliary power plant: the gas-fired auxiliary Waukesha engine, rated 150 kw, can carry the entire station and keep it operative, despite a power outage. On the engine's starboard side is a 4-cyl. inder gasoline starting engine, pull-cord cranked.

The Waukesha (model 6NKR) is equipped with an Ensign natural gas carburetor and regulator. Auxiliary engine's bore is 7-inches, its stroke 8½-inches, and it operates at 1200 rpm. It directly couples to a 150 kw, 1200 rpm, 480 volt ac generator (Electric Machinery & Mfg. Co.), the output monitored by a Westinghouse Silverstat (model SRA) regulator. Auxiliary start-up, upon power failure, is manual.

Fuel gas: one problem tapping fuel gas from the incoming suction line is that of reducing pressures from, say, a maximum 530 psig to the initial fuel gas pressure of about 110 psig. Quick pressure reductions beget hydrates, particularly when the weather is cold. Normally, fuel gas is tapped off

The Waukesha auxiliary engine at the Moreno pumping station.





Close-up of one of the Clark engines showing the McCord lubricators and the Sylphon controls.

the incoming 12-inch suction line, as we've noted. But for periods of cold weather or during high line pressures, where reduction might cause hydrates to form, fuel gas is tapped from the discharge line. In either case, fuel gas is scrubbed. Tapping the discharge during periods of cold picks up about 55-degrees over normal suction line temperatures. Why? Because while transmission line gas enters the station at about 60-degrees, it discharges gas at about 95-degrees. It is this warmer gas which is tapped for fuel during cold weather. In either case, reduction is the same from transmission pres-

sures to 110 psig thru two Fisher regulators. Fuel gas is carried to the engines (both compressor and auxiliary) and to various meters where it's further reduced to the engines' operating pressure of about 28 psig.

Master Monitor Panel: Lining one wall of the station's control office, and nearby a special closed-circuit telephone, is the monitor board which allows Moreno to operate single-handedly yet safely. The monitor board is rigged with (1) a Panalarm system; (2) plant pressure-temperature instru-

Incoming manifold system from main transmission line, showing the Blaw-Knox scrubbers.



ments; (3) line monitoring 24-hour meters. The 10-indication Panalarm: (1) shuts down compressors if cooling system fails to hold discharge gas to 95-degrees F.; (2) sounds alarm if emergency gas reservoir's pressure falls below 115 psi; (3) shuts down both engine and compressor if cooling water temperature rises above limits; (4) shuts down engine if lube oil pressure falls to 25 psi; (5) shuts down plant if compressor output exceeds 830 psi; (6) shuts down engines if rpms exceed 350, indicating overspeed; (7) warns of low line voltage, indicating need to switch to the auxiliary power supply. The control panel's clock operates independently of either gas or electricity, is a 7-day hand-wound model.

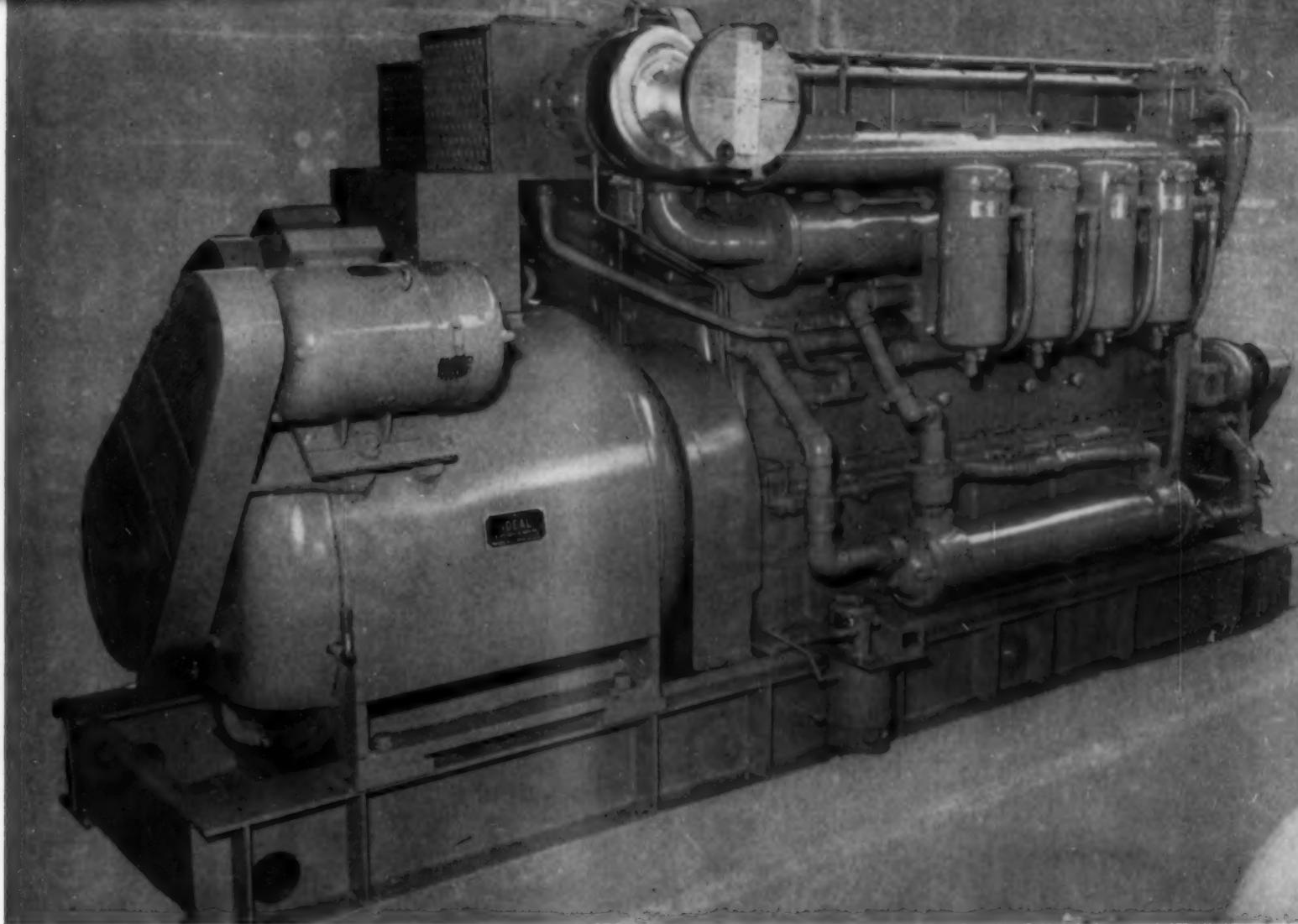
Three Barton 24-hour orifice-meters monitor the plant. Two of these meters record quantity of gas pumped thru the station. A third records fuel gas usage (in this, Moreno station is just another customer of Southern Counties Gas Co., in whose territory it is built). A fourth meter is a two-pen affair, simultaneously recording on one chart both suction and discharge line pressure.

Safety Features: Moreno boasts a dozen or more safety features, but two of them are of special interest. One involves a gas purging system which blows gas out of the engines' exhaust mufflers (by Fluor) as engines start-up. Blow-out is triggered from a 250 psi starting air line. Air purges the exhaust stacks, ridding them of dangerous gases at time of engine start-up. Another safety feature is the emergency shut-off, which not only blocks inflow of gas from the transmission line but also blows down the station to atmospheric pressure via a 4-inch blow-down stack. System operates from the incoming 16-inch suction line which is tapped by a 1-inch feeder to a pressure reducing valve working with a 150 psi storage tank. Two, 3-way motor valves are controlled by 8 remote stations throughout the plant. Normally, the storage tank is valved closed. But in case of emergency shutdown, gas pressures reverse on the motor valves and the tank acts to: (1) close the suction line; (2) close the discharge; (3) blow entire station down thru blow-down; (4) open main 16-inch station bypass valve.

Thus, compressor station is shut off and the main 16-inch transmission line opened to San Diego. The Fluor Corp. Ltd. designed and built the Moreno compressor station. Frank R. Bater is superintendent for the utility's gas department. Martin R. Engler is distribution engineer.

List of Equipment

Compressor engines—Clark.
Compressors—Clark.
Standby engine—Waukesha.
Air intake filters—Air-Maze.
Silencer—Fluor.
Standby generator—Electric Machinery.
Generator regulator—Westinghouse.
Starting air compressors—Gardner-Denver.
Jacket water pumps—Ingersoll-Rand.
Engine lubricator—McCord.
Engine oil cleaner—Fram.
Safety controls—Robertshaw Fulton.
Standby's starter motor—Waukesha.
Standby's carburetor—Ensign.



Skid mounted Superior Model 40 diesel generator set. The engine drives a 250 kw Ideal Electric generator. Note the compact package this six cylinder engine and generator make. Winslow full flow filters and Elliott turbocharger can be seen.

NEW ENGINE DEVELOPMENT AT WHITE DIESEL

By BRUCE W. WADMAN

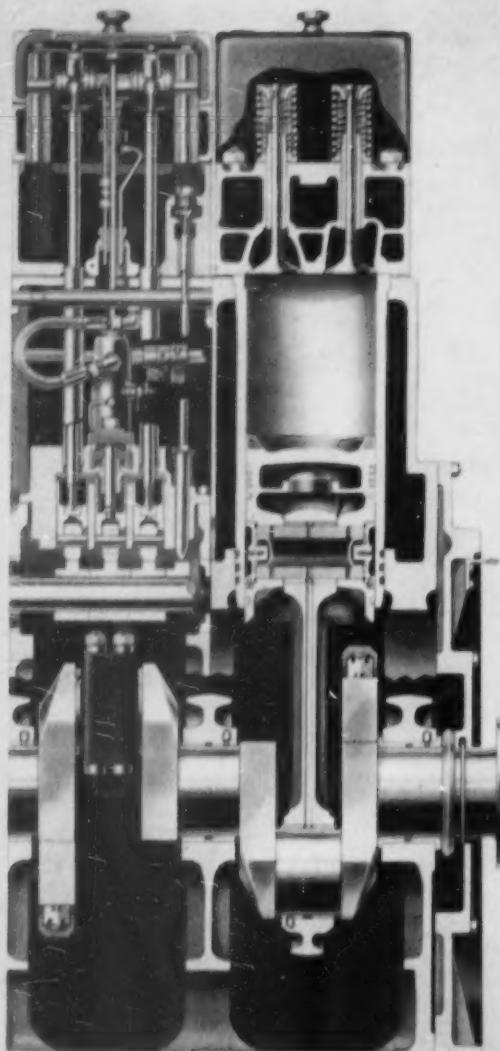
IN A RECENT visit to the White Diesel Engine Division of White Motor Company plant in Springfield, Ohio, I had a first hand look at the results of an intensive research and product development program that has been going ahead full speed on the Superior and Atlas diesel engine lines since White took them over. This program has resulted in improved performance and higher output engines in many of the Superior and Atlas models. Improvements in turbocharging, exhaust manifolding, and increases in engine rotative speeds, as well as a number of new design features of important engine parts have been responsible for the new higher engine ratings and better performance characteristics. All Superior and Atlas engines are the four cycle type, and these new developments have followed the trend today to obtain higher outputs from existing engines and even designing smaller engines to give these higher outputs. Higher engine rotative speeds have resulted

in advantages also; at the medium speed ranges, where most of these improved engines operate, combustion efficiency has been maintained by proper attention to the combustion and injection system, with the moderate increases in rotative speed. Heat transfer rate to the cooling water generally increases at a lower rate than horsepower increases. This results in about the same or slightly lower heat loss per horsepower to the cooling water, thus maintaining and even increasing the overall economy of the slower running engine when going into higher speeds. There has also been much progress in the way of higher bmepl. In this day of widespread turbocharging of four cycle diesels, it is common to have from 140 to 160 lb. bmepl. and even higher in some of the newest designs. A Superior Model 65 diesel with 172 bmepl. and developing 2000 hp. was recently installed for service in a dredge, and higher bmepl. with any necessary structural changes are

an important feature in most of the new white engine models.

The Model 65 series Superior engines, a moderately slow speed type with a bore of 12 $\frac{1}{4}$ " and stroke of 15" has increased horsepower ratings in the six and eight cylinder turbocharged models. This engine is being adapted for heavy fuel operation and is also available for dual fuel service.

Major improvements in the engine construction include: redesigned pistons with increased cooling capacity, improved lubrication system, stiffer bed, and Dyna-flex camshaft chain drive—an especially refined camshaft drive which enables smoother operation to be achieved. The Superior Model 80 line, a slow speed engine with a bore of 14 $\frac{1}{2}$ in. and stroke of 20 in., has been improved in its internal structure, and has more efficient utilization turbocharging, improved scavenging, and increase

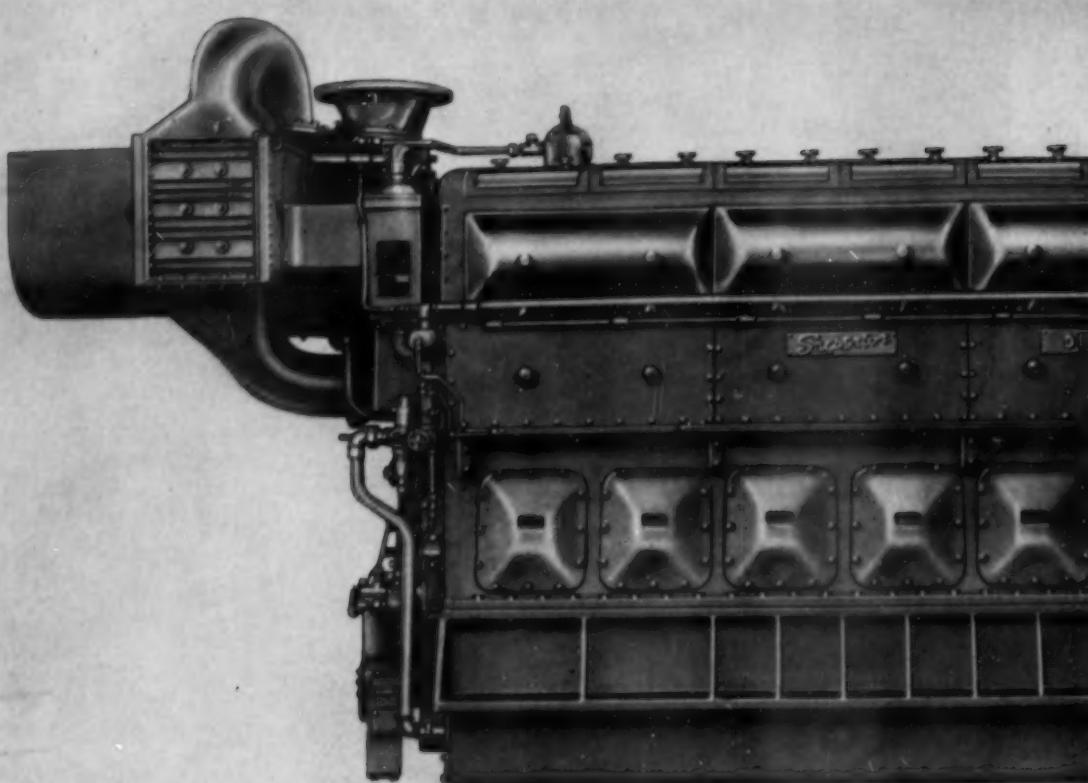


Cutaway view of two cylinders of Superior Model PTD oil field engine, showing important design improvements.

of rotative speed. This engine is now available for 375 rpm. operation.

Several of the first of these new Model 180 engines are in operation abroad for 50 cycle generating service. For dual fuel operation this engine is now being built at 148# bmeep. to deliver more power for stationary service at a conservative engine speed of 360 rpm. Old bmeep. was somewhat lower. The Model 80 engine has also been successfully adapted to heavy fuel operation in both marine and stationary applications in 1955.

Superior Model PTD and PTDS oilfield diesels have been improved greatly, with up to 30% increase in power over previous models. Important new design and construction features in these engines are as follows: (1) Improved open chamber combustion system, which gives assurance of good fuel economy in a heavy duty diesel of ~~gas~~ type. This combustion chamber design mechanically permits space for wide valve overlap with the piston at the top of its stroke. This feature allows a blast of cooling air through the entire chamber, reducing temperatures of upper cylinder walls, piston crown, injector tip, exhaust valve and seat and adds longer life to the engine's critical internal parts. Other developments in the engine's com-



Superior Model 65 x 8 diesel for use with a 1500 kw generator. This engine develops 2105 hp and is designed for operation at 200 bmeep.

bustion system include improved individual fuel pumps and injectors, optimum fuel spray pattern, and improved swirl and turbulence achieved by newly designed contours and streamlined shape of valve ports.

(2) For greater rigidity, the diameter of the cam-shaft has been increased, and for smoother performance, an improved multiple strand, pre-stretched roller chain arrangement drives the cam-

shaft. A new type idler adjustment properly controls chain flow and prolongs chain life.

(3) For smoother power under all loads, the crankshafts are precision machined, statically and dynamically balanced. This permits fast acceleration and prolongs life of engine and accessories.

(4) The engine base provides a fully bedded, distortion-free support for the crankshaft; this elimi-

Performance curves for Superior six cylinder PTDS and eight cylinder PTDS turbocharged oil field engines. These curves indicate perform-

The table below gives the ratings and the rotative speeds of the engines discussed.

SUPERIOR ENGINES

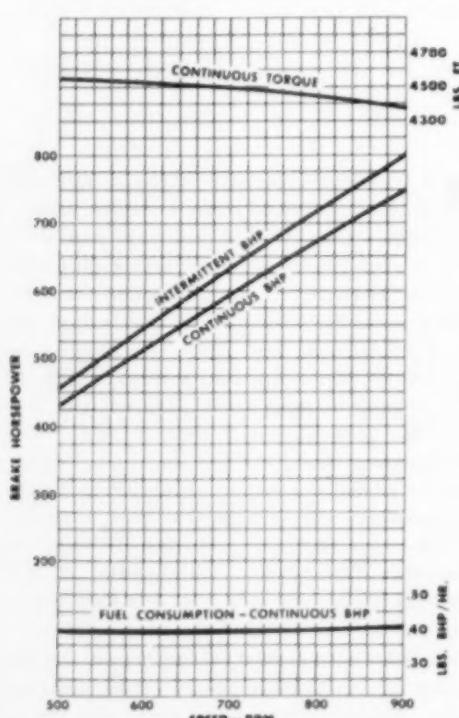
Model	Cont. hp.	Cont. rpm.
65 X 6	1105-1600	500-600
65 X 8	1470-2150	500-600
80 X 6	900-1400	300-375
80 X 8	1200-1900	300-375
40-S-6	215-425	600-1000
40-S-8	290-570	600-1000
40-SX-6	325-700	600-1000
40-SX-8	435-940	600-1000
40CS-6	240-460	700-1100
40CS-8	325-620	700-1100
40CSX-6	450-775	700-1100
40CSX-8	635-1025	700-1100

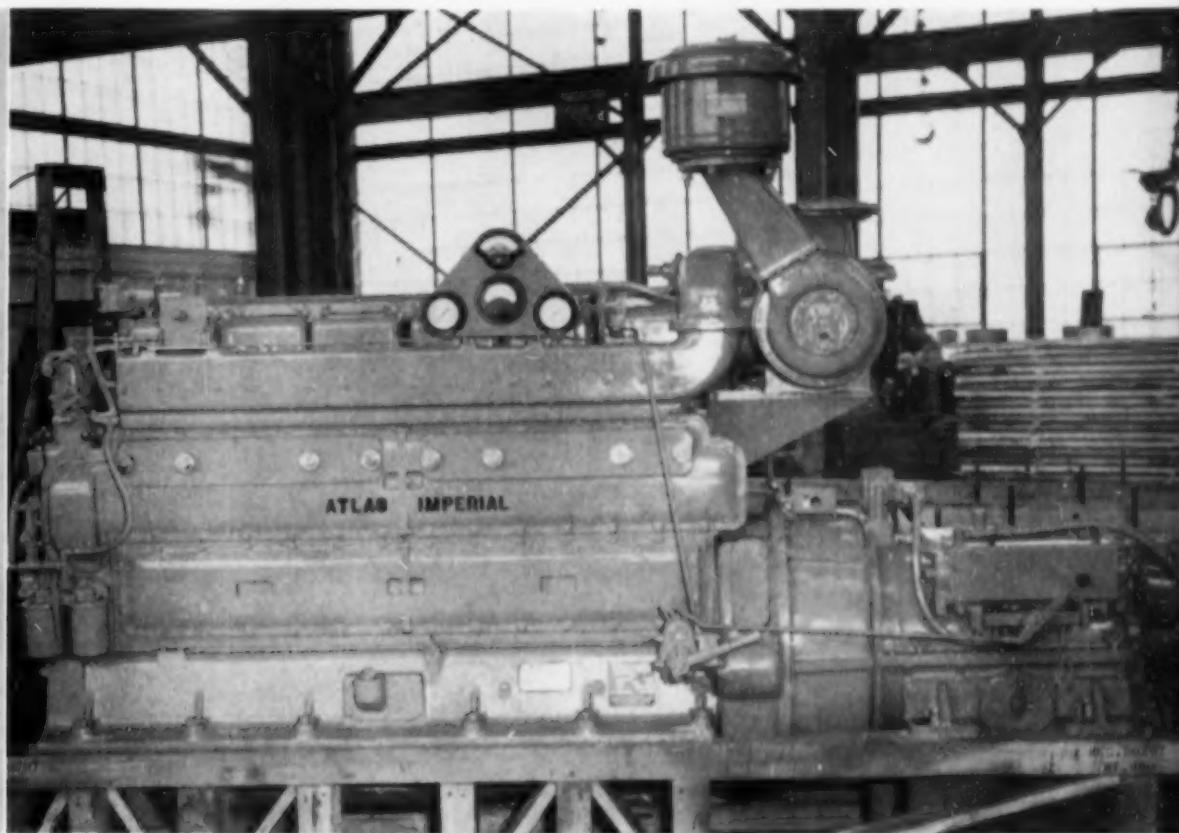
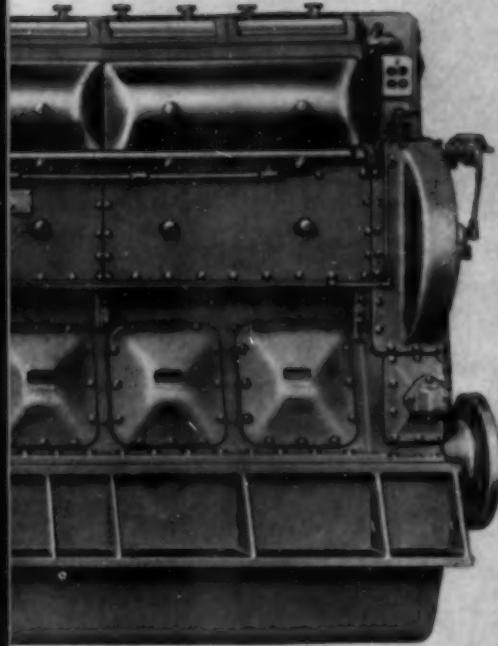
SUPERIOR OILFIELD ENGINES

Model	Cont. hp.	Cont. rpm.
PTD 6	364	900
PTD 8	485	900
PTDS 6	560	900
PTDS 8	750	900

ATLAS ENGINES

Model	Cont. hp.	Cont. rpm.
35 X 6	225-340	900-1250



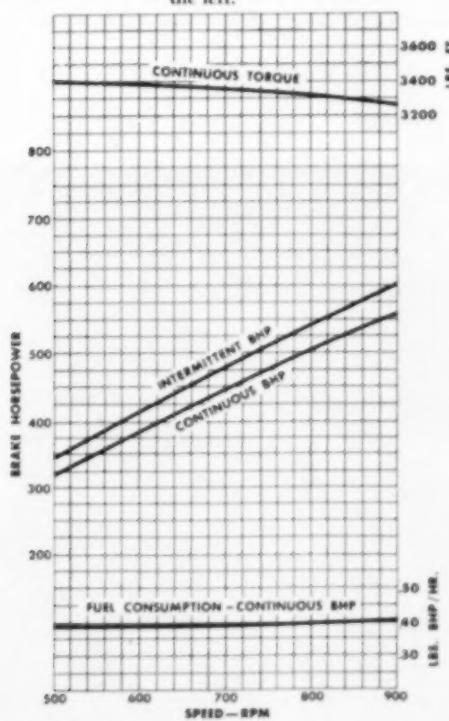


Model 35 x 6 Atlas marine diesel. A pair of these engines power the new Ram class tow-boats built by Dravo. Note Air-Mate air filter on this six cylinder turbocharged engine.

nates engine strains imposed by a crankshaft swung from the cylinder block.

(5) Cylinder block design simplifies servicing. Engine inspections, maintenance, repairs, and when necessary, complete major overhaul can be made right on the rig. All internal parts are accessible from both sides of the block through large openings with removable covers. This makes "stand up"

ance of engine equipped with all accessories, including radiator and fan. Six cylinder engine curves on the right and eight cylinder engine on the left.



servicing both practical and convenient, and eliminates the necessity of getting at internal parts from the top or from underneath the engine.

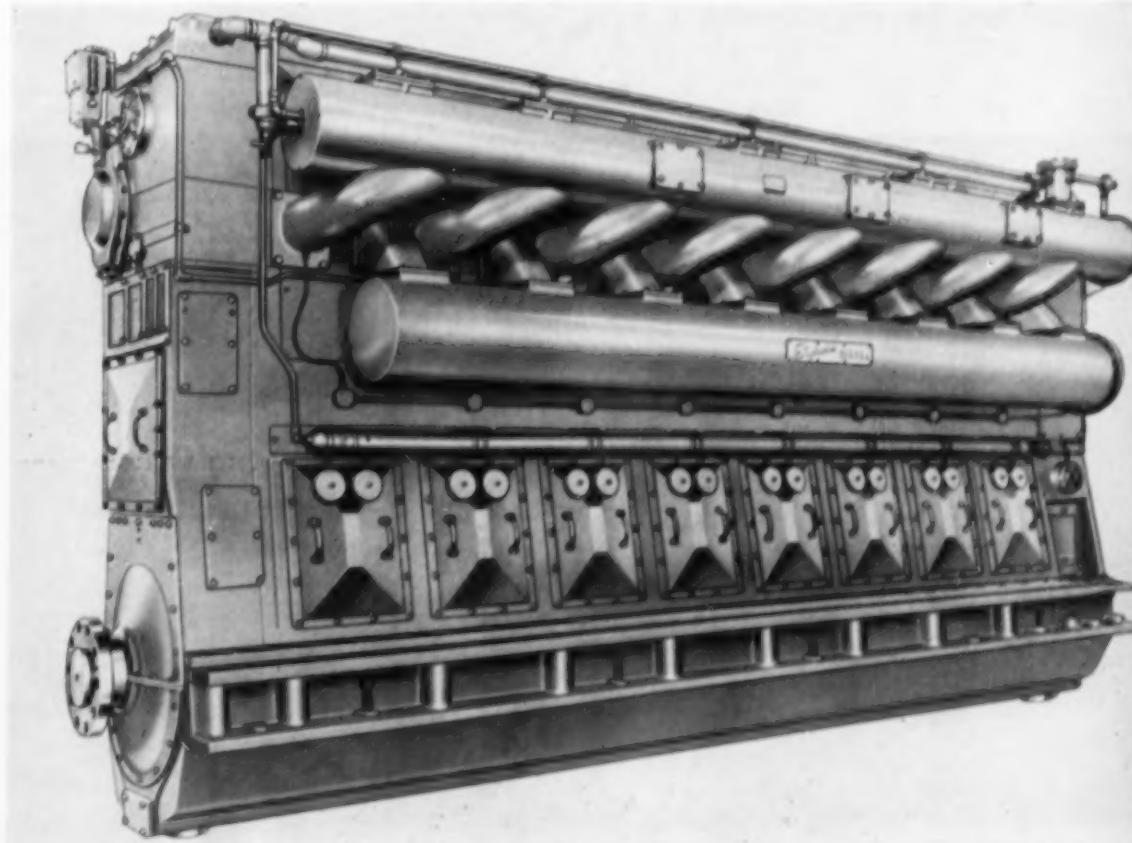
(6) Newly designed iron alloy pistons include reshaped and strengthened piston domes to provide ideal conformance to the fuel spray pattern, greater strength, longer wearing qualities, uniform expansion and faster heat transfer. New arrangement

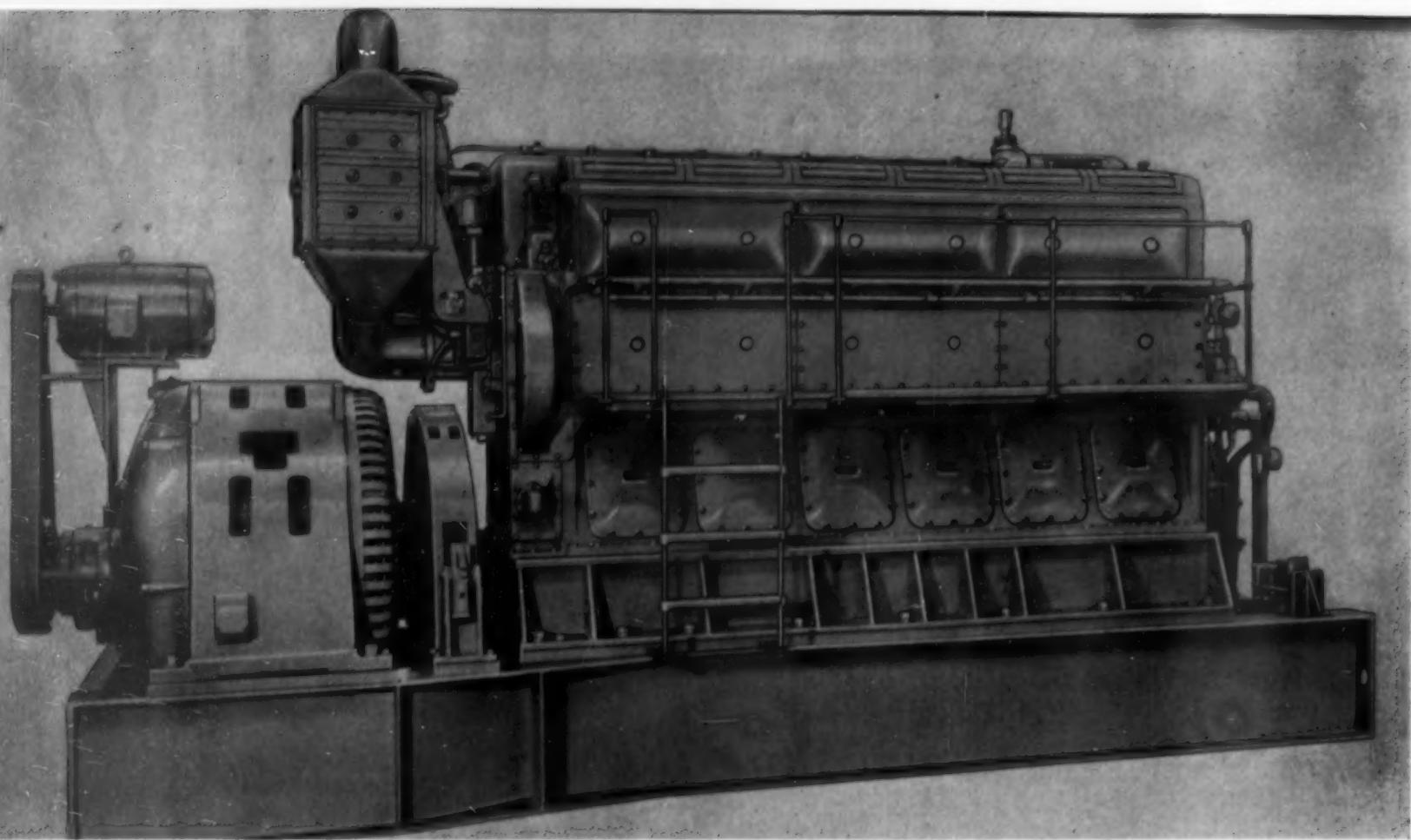
of four compression and two oil control rings further reduces lube oil consumption.

(7) New forged steel connecting rods are completely new H-section forgings which are heat treated and precision machined. Weight is carefully calibrated also, to obtain exact uniformity.

(8) Each cylinder head is an individual casting

Superior Model 80 x 8 diesel. This eight cylinder engine is suitable for burning heavy fuel in stationary and marine service, and is available in various outputs and sizes from 700 to 1800 hp for heavy fuel operation.





Because of high engine output, this Model 65 x 8 Superior diesel drives a 1000 kw generator, although the engine itself is only 135 in. long. This is a skid mounted generator set.

with two valves. Use of only two valves in each head provides simplified rocker arm construction, fewer parts, and correspondingly less replacement parts needed. Dry joint between cylinder head and block guarantees no water leakage at gasket surface.

(9) Positively rotated, special alloy valves insure longest possible valve life.

(10) Improved, full pressure lubrication system: an increased capacity pump with improved engine drive arrangement, and a new type pressure regulating valve positively maintains a constant, full

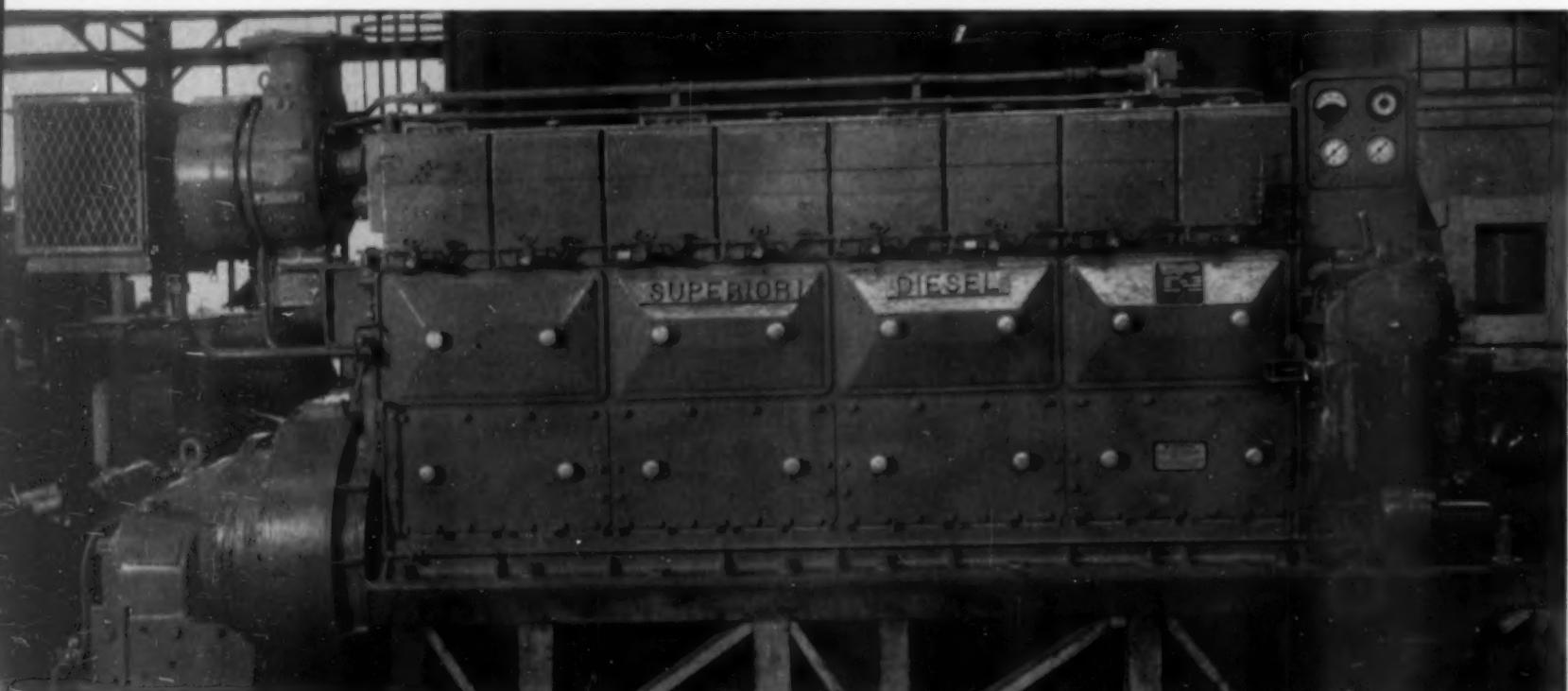
pressure of lubricating oil for proper lubrication, whether hot or cold, and at widely varying engine speeds and loads. Engine mounted full flow lube oil filters, and shell and tube heat exchanger are provided as standard equipment. External auxiliary sump is not required.

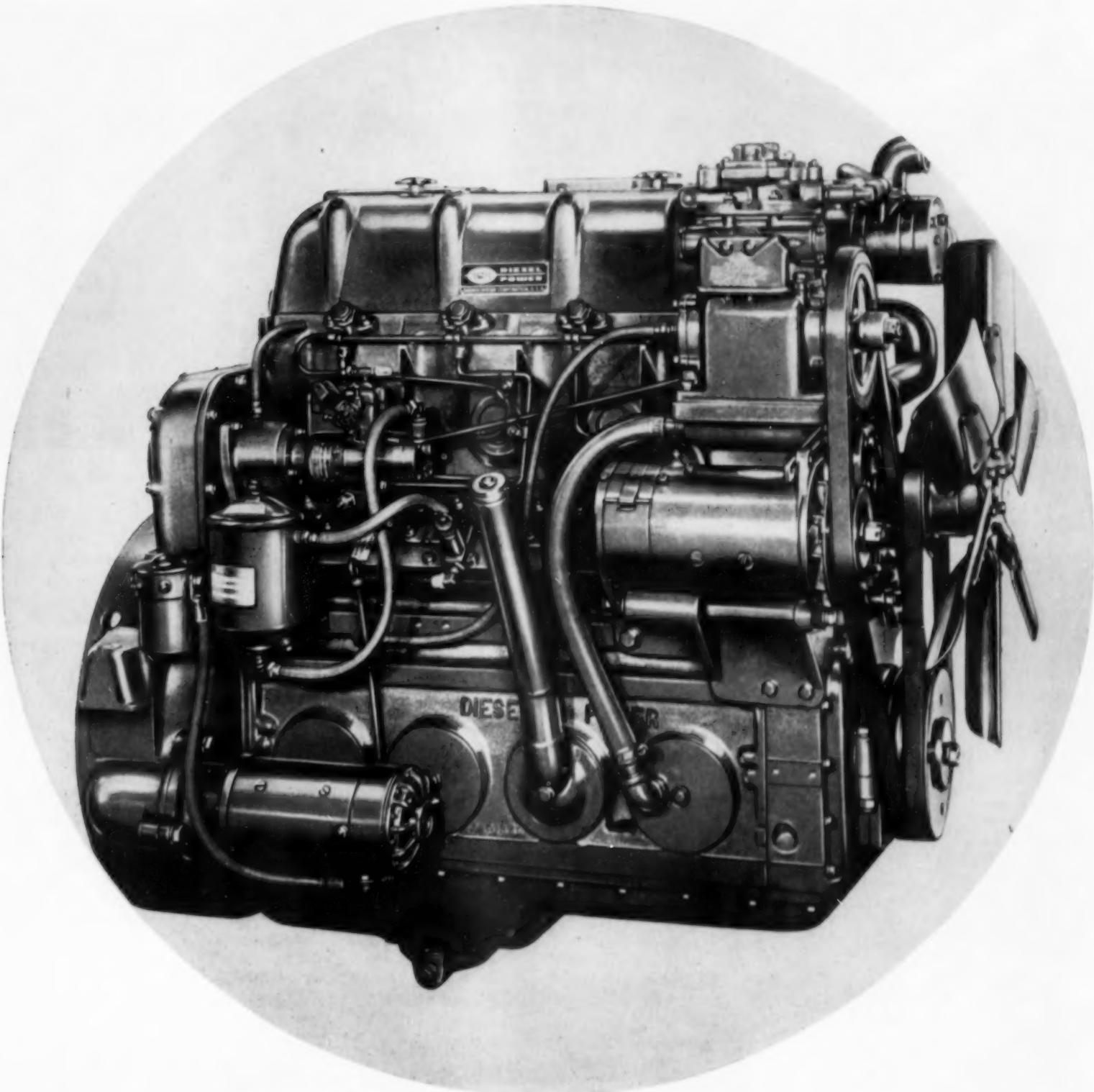
The Superior Model 40 engine, with a bore of $6\frac{1}{2}$ " and stroke of $10\frac{1}{2}$ ", is identical in size and bore and stroke to the PTD and PTDS oilfield engines and features the same new construction features as the oilfield engines. The Model 40 series engines are offered in a new higher output range from 225 to 1000 hp. This engine has operated

successfully at 185 lb. bmepr., and is finding applications as a generator set unit for construction and all types of industrial service, as well as marine application.

The Atlas line features an improved version of the Model 35 engine, which has a bore of $6\frac{1}{2}$ " and stroke of $8\frac{1}{4}$ ". Improved fuel injection system, exhaust manifolding and cylinder head design, as well as improved turbocharging has increased the horsepower output of this engine to the extent that extra engine auxiliaries can be driven for marine service, while maintaining the original propulsion power.

Eight cylinder Model 40 Superior diesel for marine service. Two of these engines will power the first of a series of Gulf Coast tugs, providing a total of 1100 hp in a 73 foot hull.





A 4 cylinder P&H automotive diesel engine. This engine develops 201 hp. at 1800 rpm. and has a dry weight of 1500 lbs. It has a bore of 4½" and stroke of 5½", and has a displacement of 348 cu. in. Note Roots-Master fuel pump.

LIGHTWEIGHT DIESEL FOR AUTOMOTIVE SERVICE

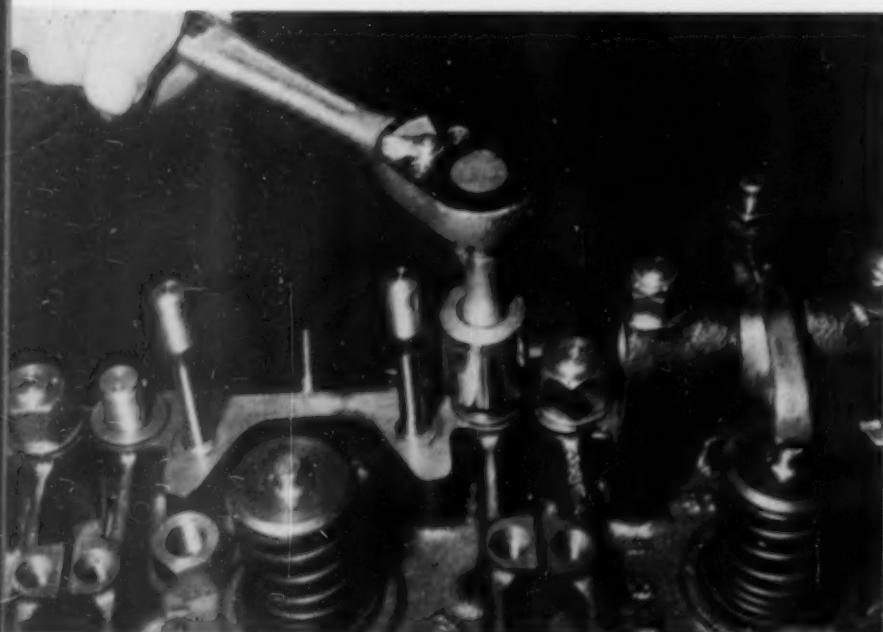
BACKED by years of experience in powering truck cranes and power shovels, the Harnischfeger P&H 2-cycle diesel engine has recently found application in automotive service and is establishing excellent performance records for truck and bus fleet operators.

The payload is a matter of critical concern to

truckers these days. Gross Vehicle Weight of 18,000 pounds per axle is under stringent enforcement in many states. This means that the weight of the components of vehicles themselves critically affects the weight limits of the cargo which can be carried. Tractor and trailer manufacturers have turned to premium materials such as magnesium and aluminum for parts to lighten the

dead weight of vehicles and increase their capacity for payloads.

The new P&H automotive diesels also have been developed with the critical payload of the trucker in mind. This diesel is described by the manufacturer as "an income producing" engine and is designed to minimize off-highway time for servicing

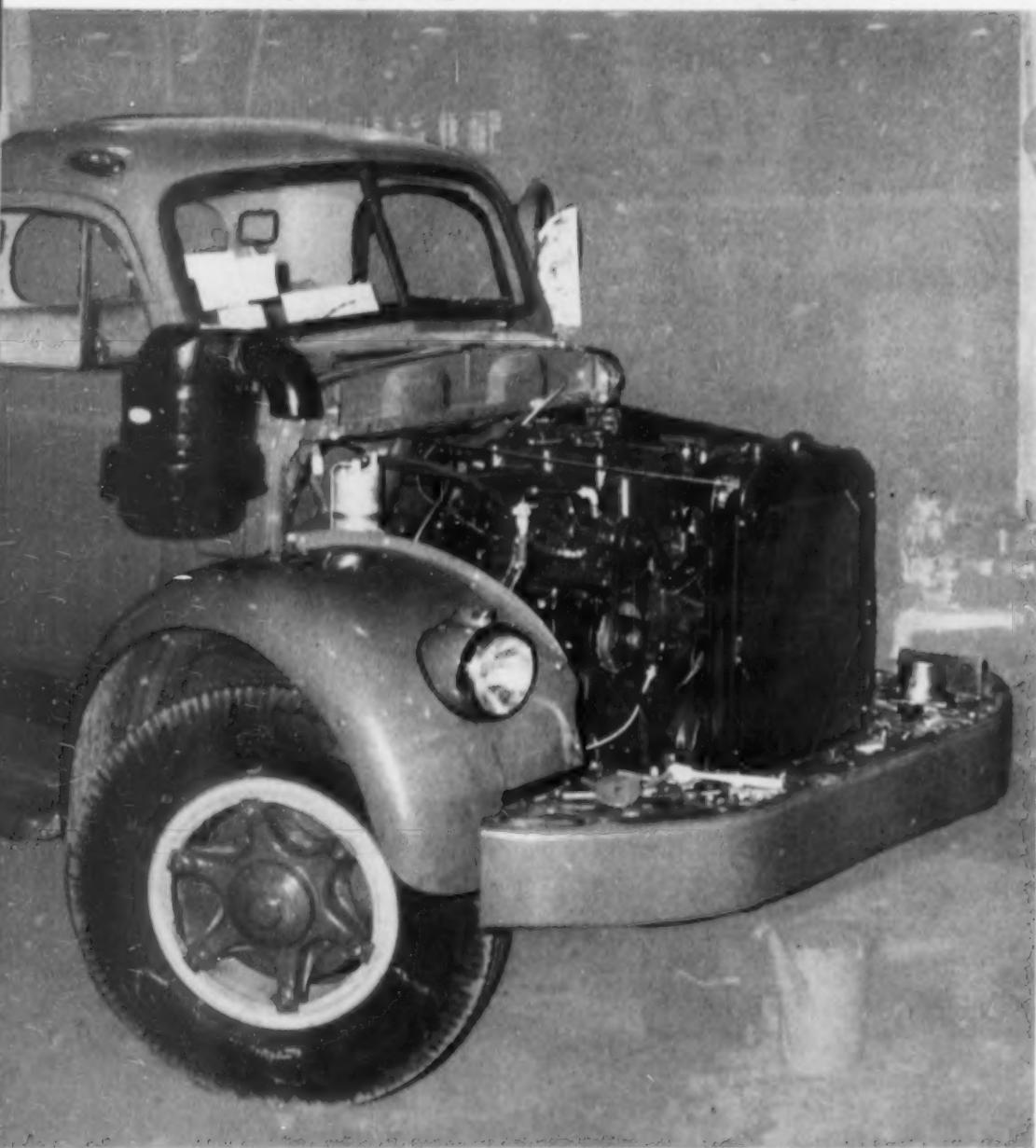


A serviceman loosening and removing four bolts, in preparation for replacing a P&H power assembly. It only takes thirty minutes for the entire operation.



Serviceman lifting power assembly out of P&H diesel. This assembly will be serviced later, on the workbench, without adding to the off-the-highway time of the truck.

A 3 cylinder P&H diesel installed in a truck, with hood removed to show compact installation. This diesel is rated at 144 hp. at 1800 rpm. and has a dry weight of 1250 lbs. It has replaced a gasoline engine in this 40,000 lbs. Gross Combined Weight truck.



and repair. Operating on the 2-cycle principle and of lightweight aluminum design, the four cylinder P&H automotive diesel weighs 1500 pounds, and is rated to deliver a maximum horsepower of 201 at 1800 rpm. This gives a power to weight ratio of only $7\frac{1}{2}$ pounds per horsepower. In replacing heavier engines of comparable output, P&H diesels are reported to have effected weight saving up to 1000 pounds.

According to truckers' estimates, a truck operating 24 hours per day should produce a minimum revenue of \$7.50 for each 1000 pounds of freight carried. The motor freight truck operating 24 hours per day for an average of 200 days per year, produces a minimum annual revenue of \$1500 for every 1000 pounds of freight hauled. Therefore, where significant savings in dead weight can be achieved, they become important factors in stepping up the efficiency of the trucking operation.

Other features of the P&H diesel include an injection system that operates at top efficiency with No. 2 furnace oil diesel fuel, a "unitized" power assembly for simplified, rapid maintenance, and a fuel distribution system that provides fast starts, and good idling, along with rapid acceleration and deceleration. The P&H injector is designed with a single .031" orifice in the nozzle. This produces a soft, atomized spray, which contributes to complete and smooth combustion without the hazards of clogging which might be encountered with a number of smaller holes in the injector tip. The "unitized" power assembly, consisting of the cylinder head, liner, exhaust valve assembly, piston and rod, is a single, compact unit which can be completely removed and replaced in thirty minutes without dropping the oil pan or touching the engine's mountings.

The P&H fuel system has 131 fewer, separate parts and is $49\frac{1}{2}$ lbs. lighter than many traditional diesel fuel injection systems. It weighs only $9\frac{1}{2}$ lbs., and is designed for easier starting perform-



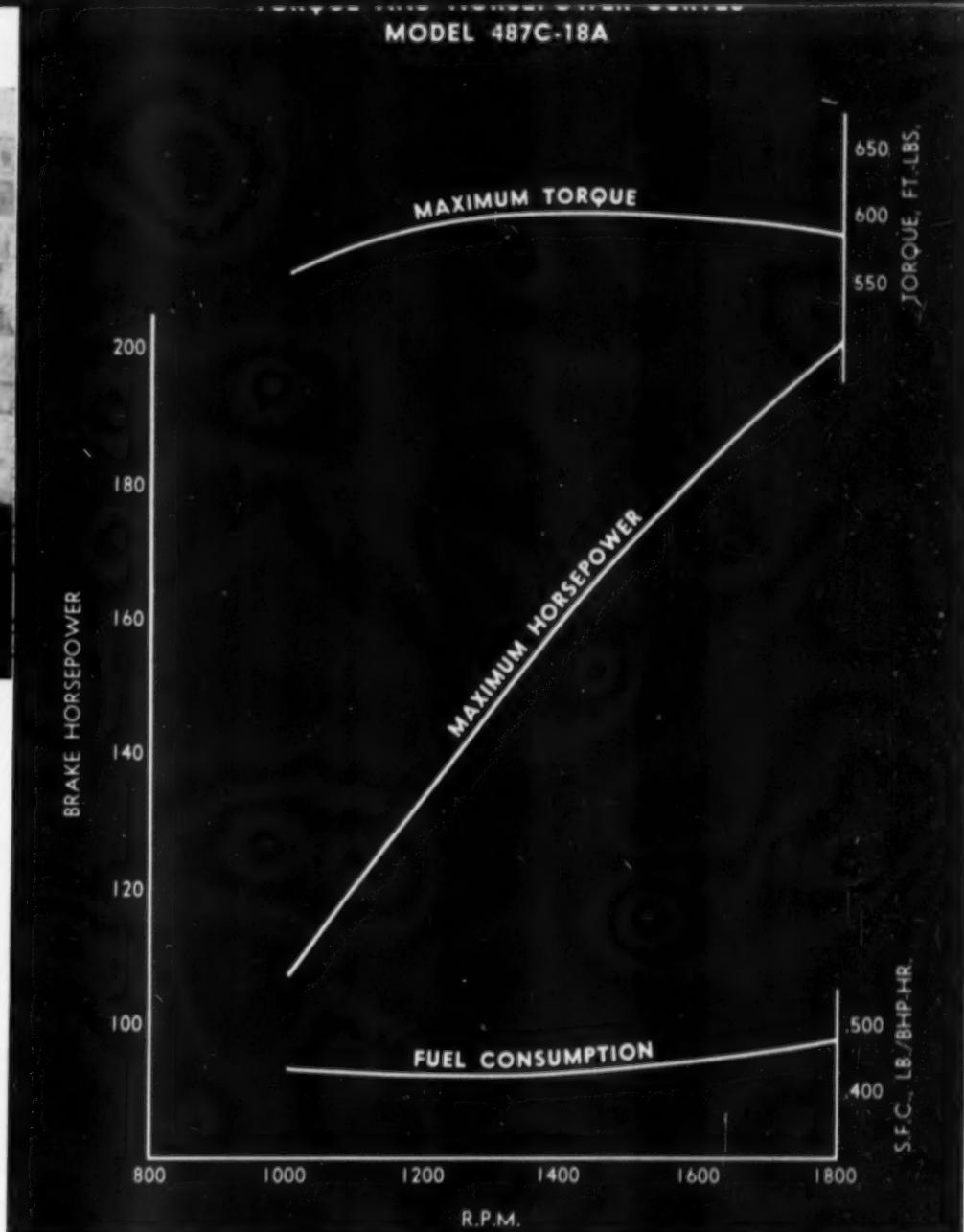
New P&H power assembly being lifted out of packing carton. This new assembly can be installed into engine as quickly as old assembly was removed.

ance. Injection is automatically retarded from starting to 500 rpm., and then injection is gradually advanced to match increased operating speeds.

When maintenance is required, the simplified injection system of this engine eliminates the need for timing each individual injector. Only one adjustment is required to time the entire engine. Designed around the Roosa-Master pump, the injection system is tamper-proof and eliminates separate pumps for each injector as well as a complex system of links, gears, racks and cams. The system also enables fast cut-off of injection—instantly reducing fuel pressure to zero. This minimizes the possibility of carbon build-up on injector tips from fuel dribble when engine is shut down, thereby preventing clogging of injector tip.

The Roosa-Master pump, which is a single-cylinder, opposed plunger, inlet-metering, distributor-type pump further improves the torque characteristics of the P&H diesel. Truckers have reported that the engine "ironed out the hills" and that they are not required to shift below direct drive on most inclines, and unless slowed by traffic, can easily climb most hills without dropping below 40 mph., according to P&H executives. Fuel economy has exceeded test expectations, state P&H spokesmen, with this 2-cycle, heavy duty engine delivering in excess of 7 miles per gallon, carrying 60,000 lbs. gross weight. Service reports from the field have indicated that the P&H diesel is a cool running engine under all operating conditions, according to the manufacturer, and this performance is attributable to liner design.

The cylinder liner is the "wet" type, and is completely immersed in circulating water — thus is cooled throughout the total length and diameter. The path of water circulation is from the bottom of the liner upward between the walls of the liner and the lower water jacket. The water is then forced through holes in the liner around the "port



Torque and horse horsepower curves for P&H 4 cylinder 2-cycle automotive diesel. Ratings are based on engine performance less fan, generator and compressor.

belt" and to the upper part of the liner, between its walls and the upper water jacket. In the combustion area, or the upper part of the cylinder liner where heat concentration is greatest, cooling water is channeled close to the innermost circumference of the liner. It is designed to quench the heat of combustion at its source and eliminate localized, concentrated heat which ordinarily would have a tendency to warp and crack heads.

The engine is designed for long life in automotive service, and this is due primarily to the effective adaptation of aircraft-quality materials to a diesel engine design. The cylinder head, which is made of alloy cast iron and provides for exceptional cooling area, contains Stellite valves and valve seats, double coil, self-dampening springs and replaceable valve guides. The cylinder head is threaded to the cylinder liner with precision threading. The sealing surfaces are machined to within .0002", eliminating the need for gaskets.

The metal to metal seal permits uniform heat transfer between the head and liner. Connecting

rods are made of alloy steel, forged and heat treated for maximum strength and resistance to fatigue. Rod bearings are aluminum alloy bearings of large diameter, resulting in low bearing pressure.

Wrist pins are full floating and wrist pin bushings are made of alloy bronze, ground for maximum lubrication. All wearing parts are completely interchangeable between different models of the engine, which simplifies inventories and lowers repair costs. The simplicity of the design of this diesel makes servicing an easier, faster job, and reduces off-the-highway time for drivers as well as equipment.

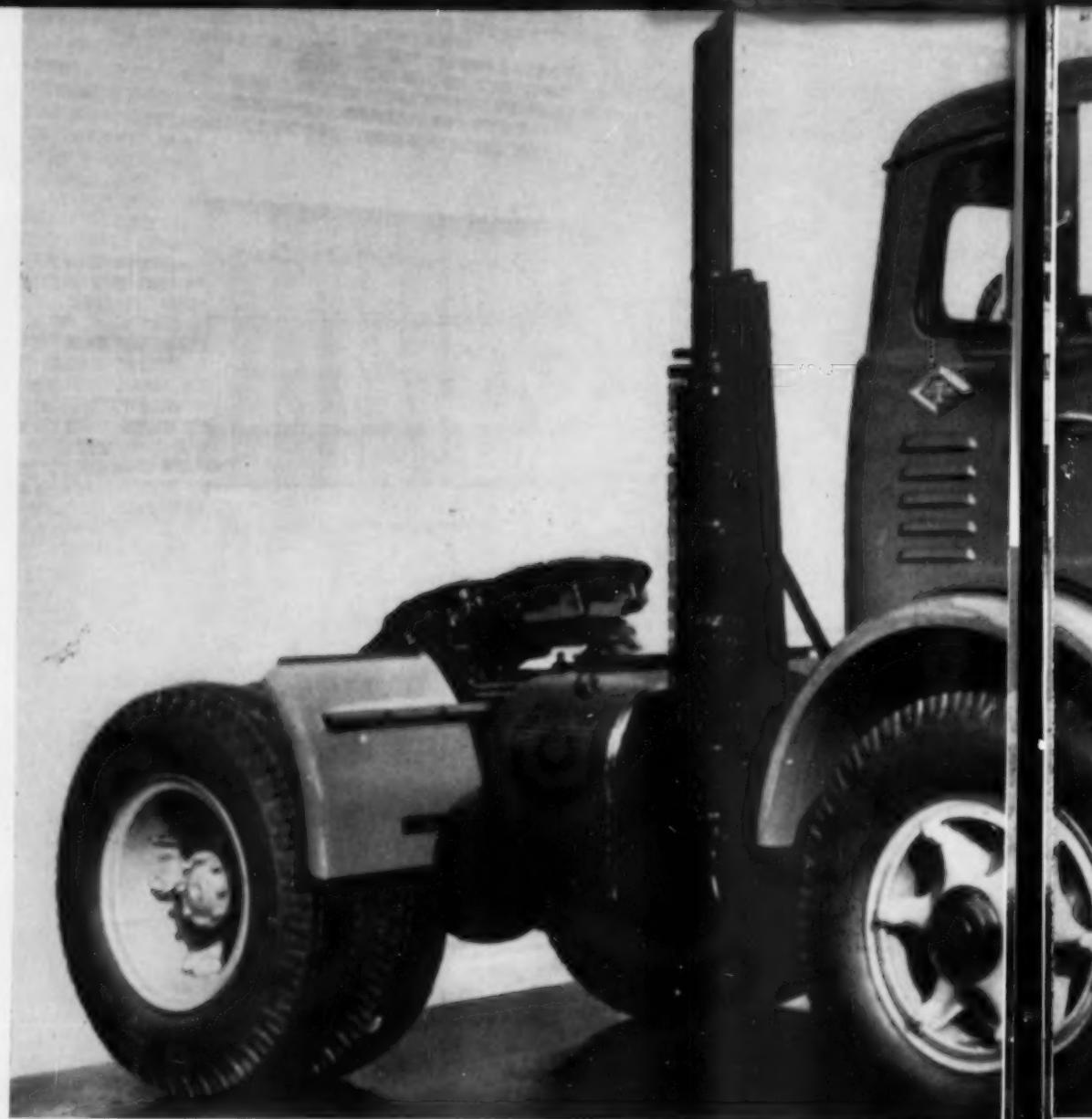
The payload performance of the new P&H diesels in trucks is another indication of the superior advantages of modern diesel engines in automotive applications. Long life, economy of operation, improved performance, and ease of maintenance are big reasons why diesel engines are securing ever widening acceptance in many areas of automotive service, where, formerly, only gasoline engines have been used.

ANNOUNCEMENT of Diamond T's new tractor Model 723CJT derives additional interest from their statement that "Advance sales of this model have exceeded all past records for Diamond T diesels, and production is currently scheduled at the rate of more than \$5,000,000 a year for this model alone." According to Z. C. R. Hansen, executive vice-president, this new Tilt-Cab model provides about 2,000 lbs. of extra payload capacity under common legal restrictions, and adds a saving of around two cents a mile in fuel cost, as compared to conventional gas-powered tractors in this field. To these advantages are added an ease and completeness of accessibility not equaled in any other design.

"Model 723CJT was developed expressly to cut costs and increase profits for the largest single class of highway haulers, those handling payloads in the 18-20 ton range with tandem axle semi-trailers," said Mr. Hansen. As a tractor model it is rated for 60,000 lbs. gross combination weight, yet base chassis weight is only 9,500 lbs., of which less than 3,100 lbs. is at the rear axle. Chassis and cab dimensions permit the use of 35-foot square-nose "Hi-Cube" trailers in 45-foot limit states with ample freedom of king-pin positioning, even with vertical exhaust stack and guard. Bumper to back of cab is only 76 in., and less than 84 in. with sleeper cab mounted in it.

In Model 723CJT Diamond T engineers present an advanced development of the COE design with the light-weight turbo-supercharged Cummins JT-6 diesel engine. This power plant is already established as providing exceptional performance without sacrifice of traditional diesel efficiency, economy and long life. Piston displacement is 401 cubic inches, but it develops 405 lbs. ft. of torque, and 175 brake horsepower at governed speed of 2200 rpm. As employed in Model 723CJT, the newest Cummins PT fuel pump is standard, and fuel mileage

Easy entrance, spaciousness and picture window visibility make this well-ventilated driver's "office" a pleasure to work in.



DIAMOND T'S NEW TRACTOR

**The Model 723CJT COE Unit Is Powered By
A Cummins JT-6 Diesel Developing
175 Bhp At 2200 Rpm**

is extraordinary, showing upwards of 7 miles per gallon with maximum trailer loads in a long series of test runs, and also in fleet operations.

This exceptional power and economy is due in large part to the application of the exhaust-driven turbo-supercharger. The turbine secures its power from the inertia and expansion of the exhaust gas. The crankshaft is not required to furnish the power for the supercharger drive, and the full output of the engine is available at the flywheel. There is also a further gain in high altitudes and mountainous country. With turbo-supercharging the turbine speed and the supercharging effect are not tied to engine speed. In thinner air the exhaust is working into a partial vacuum and produces more power. Similarly the lighter intake air creates less load for the centrifugal charger. With greater power

and reduced load the turbine spins faster, automatically increasing the output of the charger and largely restoring the normal intake pressure and volume. This feature is of particular advantage in altitudes of 5,000 feet and upwards, where the performance of conventional vehicles, both gas and diesel, suffers substantially.

Successful application of the JT diesel in a full COE tractor is credited to the unique Diamond T Tilt-Cab design, which eliminates all former problems of accessibility. The complete cab, cowls and fender assembly tilts forward manually in a matter of seconds so that the entire front end area is "wide open" for inspection and service. A simple set of counter-balancing springs provides the power to lift the cab, which works on the same principle as a tilting garage door.





The Diamond T Model 723CJT tractor chassis with saddle tanks, rear quarter fenders and fifth wheel, ready for the road. Power is by a Cummins JT6B diesel.

Additional to the JT-6 Cummins diesel engine, major specifications include the Rockford 15 in. single plate clutch, Fuller 5A650 heavy-duty five-speed overdrive transmission, Timken FD-900 front, and Eaton 18803 two-speed rear axles, with Westinghouse air brake system. Frame is designed for maximum strength with minimum weight. Side rails are of high-tensile steel with straight channel sections 8-1/16-in. x 3-1/32-in. x 1/4-in. Heavy-duty 12-volt electrical system includes 50-ampere generator and four large 6-volt batteries, with a total of 300 ampere-hours capacity.

In Model 723CJT, Diamond T engineers have provided an option of several single-speed rear axles with the Fuller eight-speed R46 transmission, which provides performance comparable to the two-speed and five-speed transmission and requires less skill to handle. This combination will be favored by many operators, especially in level country. Choice of the single-speed rear axle is largely a matter of the buyer's preference. Options include the Eaton 1893 which is the single-speed equivalent of the standard 18803; also the Eaton 1911 which is identical in design but with heavier housing, gears and

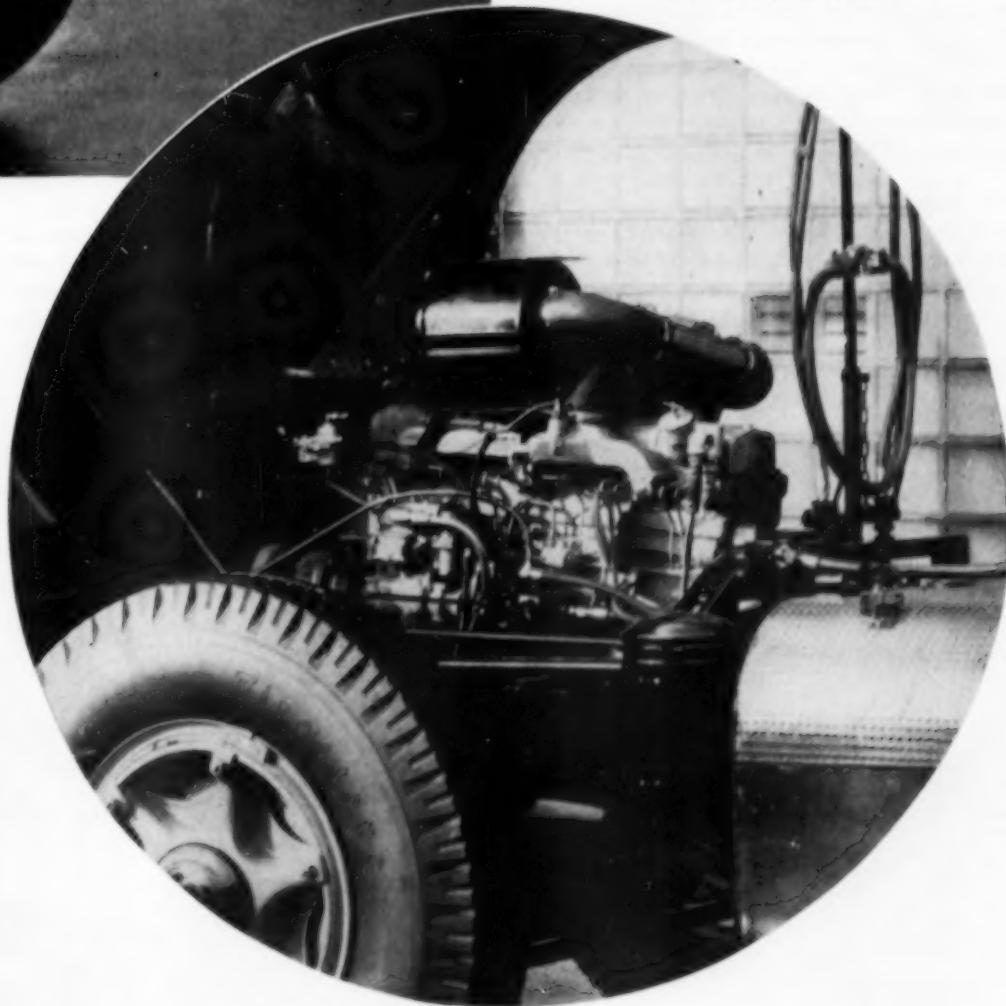
shafts; and also the Timken hypoid R100 which is particularly favored for extra-heavy-duty service.

The case for the Tilt Cab diesel, apart from the unequaled accessibility provided by this design, is largely a matter of the important increase in payload capacity and large reduction in fuel cost. In general, rear end weight of the complete tractor, ready for the road, is approximately 1,000 lbs. less than for the conventional gas tractor of comparable size, or conventional diesel. This reduction in rear axle weight permits an increase of approximately 2,000 lbs. in load at the king pin.

The saving in fuel cost is even simpler and easier to figure. As against a common average of 4½ miles to the gallon and a net cost around 5¢ a mile for the gas-powered tractor, Model 723CJT can be counted on to deliver better than 7 miles to the gallon and provides a net savings of 2¢ a mile and upwards accordingly.

Widest use of Model 723CJT will naturally be as a conventional tractor, but six-wheel variations are available with a choice of Eaton-Hendrickson and Timken tandem-drive rear axles for both highway and off-highway service. Six-wheel models carry a rating of 41,000 lbs. gross vehicle weight in preferred service.

The tilt-cab makes for easy accessibility of the engine. Major specifications include a Rockford clutch, Fuller transmission, Eaton rear axles and a Westinghouse Airbrake system.



CANADIAN PACIFIC GOES DIESEL

Part III

By CHARLES F. A. MANN

A few miles west of Kenora, in the far western end of the vast, complex Province of Ontario, the huge Lakes forest region abruptly gives way to the even larger Canadian prairie region. Forty miles east of Winnipeg, near the Manitoba-Ontario border, the change in topography of the Canadian shield and timber complex to the rich soil of the flat prairies that stretch like a rolling ocean, upward and westward to the Rockies, is so abrupt that a Domeliner passenger may be looking at wheatland one minute, and by the time he lights up a fresh cigar he is in a forest belt that runs unbroken for nearly 800 miles across the middle of Canada!

Effect of the change on railroad problems of the Canadian Pacific is equally abrupt. The 975 miles from Sudbury to Winnipeg without a branch (except on the eastern outskirts of that City), gives way to a series of secondary main lines and branches tapping the wheat, cattle, oil and mineral empire of the Provinces of Manitoba, Saskatchewan and Alberta that give the Prairie Region of CPR over 9,000 miles of track. The Pacific Region, comprising British Columbia, adds 1994 miles more, the combined total mileage being larger than our own Baltimore & Ohio Railroad!

The world's greatest flood of grain moves down from the marshalling yards at Winnipeg over a double track line to Port Arthur-Ft. William. Steam and diesel both handle this grain movement on a year-round basis. Westward the branches act like a collecting system. CPR operations for the prairie

region have their executive Staff at Winnipeg and the operating and mechanical staffs at Calgary. Vancouver operates the Pacific region. Including the 1955 deliveries approximately 117 diesel units were maintained at Calgary and 75 at Nelson, with large increase in the diesel fleet slated for 1956.

But two primary general shops are maintained by the Canadian Pacific—the famous and very large Angus shops at Montreal and the Ogden shops east of Calgary. At the close of 1955 approximately 70% of the work on the Prairie region was being done by diesel, while the Pacific region was way past 95%, and by summer will probably be 100% if the mine runs to Kimberly on the Kettle Valley secondary main line are converted to diesel. More than 100 steamers in the prairie region were scheduled to be scrapped in the 1955-1956.

Utilization of diesels on the Canadian Pacific presents interesting contrasts. A typical month last year showed the fleet of 53 units in the transcontinental passenger pool from Montreal to Vancouver and return hitting 18,586 miles per unit for that month. The lonely little fleet of straight passenger units operating between Montreal and Sherbrooke averaged 6796 miles. The fleet of 126 units operating in the Eastern Region averaged 10,694 miles. The Pacific and prairie regions showed an average of 10,448 for 87 road units based at Calgary and 7,355 miles for 55 road units based at Nelson. To get a broad picture of the Pacific and prairie region dieselization, first, the rough mountain goat railroad operations on the Kettle



Valley line have enabled the CPR to set up a practically autonomous diesel operation from the junction at Hope, B.C. to Lethbridge, Alberta, with the Kettle Valley Division administered out of Penticton, B.C. and the rugged Kootenay Division headquartered at Nelson, B.C. To operate this region, the very first modern diesel shop in Canada was built at a cost of \$1,500,000, which entirely replaced the old steam shops there. This was quickly followed by a modern streamlined diesel shop at Alyth yards, Calgary, just west of town. These two spectacular new shops, a basic part of the \$68,000,000 CPR 5-year diesel program, keep everything shipshape from Ft. William to Vancouver. Somehow, everything on the system west of Lake Superior except the transcontinental passenger diesel pool, cycles through these two shops for regular service. Montreal, the "beginning" point of the passenger pool locomotives, is a natural service point, so the new St. Luc diesel shops will do this work.

So, Nelson diesel shop takes care of the southern transcontinental route work, where every unit is a road switcher type and enough of them have heating boilers, so that motive power can run one way freight and one way passenger with no wasted time in layovers. Calgary shops take care of the northern main line plus most of the prairie system





A Canadian Pacific passenger train in the Canadian Rockies, in Alberta along the Bow River.

routes. And there are some company officers who feel that eventually, Regina or Moose Jaw will get another diesel shop as the prairie region loses its remaining steam fleet.

Full dieselization of the Pacific region has already produced an interesting secondary saving. The big fleet of powerful oil burners used in the mountains have rolled up \$186,000 per year saving when transferred to high speed freight service on the hill and dale prairies due to increased fuel efficiencies at higher speeds, less worn running gear from sharp mountain curvature and greater daily mileage. As usual, steam is at its best at high speeds on fast track and little slugging at low speeds. So, it is expensive anywhere in the Far West and the diesels make statistics look pretty sick for steamers.

The prairie region in many respects corresponds to the Union Pacific's Omaha-Ogden line where the road switcher diesel and the Bunker C fired gas turbine are battling it out side by side. One or two CPR officials already tactfully admit that the gas turbine has a spot from Winnipeg to Calgary and on the line to Edmonton, where ton-

nage, speed and high utilization, plus access to Bunker C fuel may make a small fleet economical to operate. It is interesting to note how the CPR has grouped its different makes into operating pools. At Calgary, there are practically nothing but General Motors type. Thirty of the units are closed cab jobs while all the rest of the 117 assigned are road switchers of three types. At Nelson the pool is heavy toward the Fairbanks-Morse C.I.C. units, some 38 in all, and 36 Alco-M.L.W. units, the whole fleet being 100% road switcher types geared for 65 mph and all with dynamic braking. Twenty-eight of the Fairbanks Morse units have steam generators. Thus, Alyth shops carries practically nothing, but supplies and parts for GM units while all Alco and FM units are stocked from a single shop at Nelson.

In addition to the road unit assignment for prairie and Pacific regions, our typical month shows a sizeable fleet of straight diesel switchers. The roster shows 30 Alco; 20 M.L.W., 13 GM and 18 Baldwin units and 13 Baldwin road switcher units, 5 equipped with steam generators, for use on the E & N Railway on Vancouver Island. The rest are on the Vancouver Division for terminal switching. The passenger road FP GM units carry 1280 gallons of water in the A units and 300 lb. steam generators, while the B units have two types of steam generators, some with 300 lb. and some with 4000 lb. capacity. All B passenger units have 1500 gallon (imperial) water capacity. All A & B passenger units have dynamic braking.

Surviving steam in the Pacific and Prairie regions will gradually be relegated to the Saskatchewan and Manitoba Districts where economic factors, coal, oil, fuel, water, topography, etc. all combine toward the most favorable utilization; essentially the same factors that obtain on the Illinois Central railroad.

Oddly, the Canadian Pacific has gone almost 100% impartial in choosing its diesel fleet. While most railroads, after an initial period of testing them all, turn to one particular make as they build their fleet, the CPR keeps on with almost equal treat-

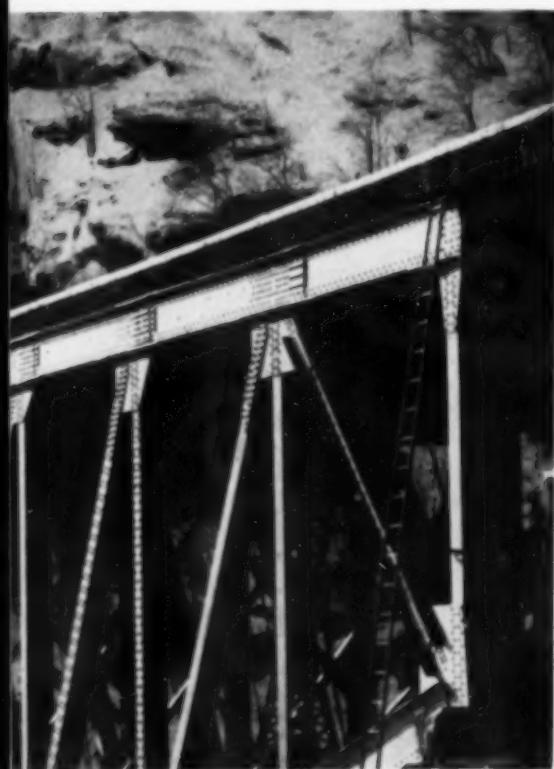
ment of all three Canadian locomotive builders. In 1955, they boldly tested a CLC "Trainmaster" unit everywhere from Saint John, N.B. to the Kettle Valley route. Upshot was that the year ended with 97 units purchased for a total of 129,750 hp., the year 1956 showed 88 units for a total of 151,640 hp. The reason for this was the sudden purchase of a fleet of 30 CLC Fairbanks-Morse "Trainmaster" units of 2400 hp. on 6 driving wheels, one of the largest single orders for this type ever placed.

These big boy diesel units carry a 12 cylinder OP diesel, 1500 imperial gallons of fuel, 2000 imperial gallons of boiler water, dynamic brakes and a 388,000 lb. load on six axles, and are the largest diesel units in Canada. While no official pronouncement from the top officers has been forthcoming, it is generally felt that here is, at last, the CPR's big push toward final elimination of steam. These 30 large-size diesel units will displace 50 or 60 steamers, and the Canadians, like the British, love the opposed piston, valveless diesel to pieces. The fleet on the Kettle Valley Line have given wonderful account of themselves so far.

Just why the CPR built one of the finest diesel shops in North America at the pioneer western Canadian rail center of Nelson, B.C. is hard for anyone not familiar with the geography and topography of British Columbia to figure out. The Province is one of the great geographical masses of the world. It occupies over 366,000 square miles.

Highways have barely penetrated a tenth of the area and its 3800 miles of railroad track scarcely tap a fourth of the Province.

Nelson, lying some 400 rail miles east of Vancouver, in the heart of the Kootenay Lake country, is about halfway between Lethbridge and Vancouver on the Kettle Valley or Southern transcontinental route of Canadian Pacific. Because Kettle Valley Line is an "originating line," gathering the great fruit harvests of the Okanagan Lake County in the "dry belt" halfway between the Fraser River and Nelson; the forest products of many timbered areas; the mineral wealth of the mineral belt near Kimberly and Princeton and the coal belt near Fernie and Crows Nest, close to the Alberta border, it brings in heavy freight tonnages from both ends of the line, as well as long hauls of agricultural





Four MLW-FM road switcher units coupled to haul a 3200 ton train up a 2.2% grade at 12 mph.

products and finished metals clear across Canada. Heart of the industrial part of this traffic is the huge plant of Consolidated Mining & Smelting Co. at Trail, not far Southwest of Nelson, where 3,000,000 tons of ore annually are converted to a million tons of nonferrous metals and fertilizers. It takes a trainload of coke and coal each week plus 4 carloads of fuel oil to keep Cominco running—not to mention 95,000,000 daily gallons of water and 310,000 continuous hp of electricity and 8,000 employees. So, this one industry generates 40,000 carloads of railroad traffic annually on the Kettle Valley Line. And, best of all, Cominco is not only CPR's biggest single western traffic source, but 51% of it is owned by the Canadian Pacific Railroad.

So Nelson shops, beside the Kootenay River, just east of where it dumps into the Columbia River, and at the west end of Kootenay Lake, became the "Show Window Diesel Shop" of the entire Canadian Pacific and actually the first of the three to go into operation throughout the System. First Nelson, so half the number of diesel units could operate the entire line than it took with steam; then Alyth at Calgary and finally St. Luc, outside of Montreal. The engineering and physical factors alone justified dieselizing Kettle Valley Line if not one cent could be saved by way of fuel, maintenance and manpower! Only dieselizing the Rio Grande railroad in the U.S.A. is anywhere comparable anywhere on the Continent.

Nelson Shops occupy the approximate site of the old steam shops handily across the tracks from the railroad station, on cut and fill land close to the riverbank. The shop building is 305 x 97 feet, with two through tracks, each large enough for a 4-unit diesel. It also has two shorter tracks; a truck release track, administration offices, testing laboratory, stores and work rooms. Ten diesel units can be housed at one time on the shop tracks.

Nelson Shops cost over \$1,500,000 to build and equip, which, together with the fleet of 75 diesel units acquired at a cost of \$14,000,000, represent an investment that the CPR Research Dept. says it

will get back in 7½ years because of the drastic reduction in train expense made possible by abandoning steam! It is interesting to observe that the first mortgage bond issue on the Kettle Valley Railway from Hope to Castlegar, or about half the route, is carried on the CPR's current financial statement at almost the same value as the cost of dieselizing the entire route!

Alyth Shops at Calgary are almost identical in size and facilities to the Nelson Shops and serve a larger fleet of diesels operating on the North or main transcontinental line. Upon completion of Kettle Valley line dieselization 92 steamers, mostly over 37 years of age and built for this curvaceous route were retired.

The 11 Baldwin 1,000 hp road-switchers assigned to the Esquimalt & Nanaimo Ry., CPR's Vancouver Island subsidiary, and the new Budd RDC car that makes a daily round trip between Victoria and Courtenay (which replaced 2 steam trains and boosted gross income!), are all serviced at Victoria. Replacement parts and final heavy repairs are handled eventually at Ogden shops. The E. & N. on the far-west CPR island run was one of the first to go diesel, but the far east subsidiary, the Dominion Atlantic Lines in Nova Scotia, remain 100% steam. A contrast in two degrees.

The CPR has to rustle up 250 new cars and 50 locomotives just to run two trains across its giant country every day. And the service must be the same at both ends and middle, 365 days per year, at 45 below zero or 105 above! The research department's work at Montreal, in charge of Fred Stone, has done its work so carefully that by the time the \$68,000,000 5-year diesel plan and its \$50,000,000 rolling stock plan gets into full operation, plus perhaps another \$30,000,000 to make it 100% completed, that the whole program will not deviate 2% of research department's forecast six years ago.

At this point, the key official personnel of the operating setup, principally in the Pacific Region, should be recognized for their excellent and speedy



The Train No. 67, the Kettle Valley Express, Medicine Hat, Alta. to Vancouver, B.C.

organizing of the changeover from steam to diesel. General supt. of motive power for the whole prairie and Pacific regions is Mr. E. G. Bowie, assisted by T. F. Donald, with headquarters in Winnipeg. J. N. Fraine is general supt. of the Alberta district of the prairie region. J. L. Hall is supt. of the Calgary division, which extends west to Field, B.C. From there, the Revelstoke division is headed by G. Meldrum. Key man on the Kettle Valley route is George Phillips, supt. of the Kootenay division, which is almost a self-contained railroad in itself. The Kettle Valley route officially ends at a narrow train yard called Ruby Creek, on the steep bank

of the Fraser River 81 miles out of Vancouver. Freight trains are made up there and crews called from that point. Proceeding east a short distance, the KV line crosses the Fraser and into the historic town of Hope. From here the line climbs up the sheer sides of Coquihalla River Canyon for 36 miles, from 188 feet above sea level to 3658 feet, in one continuous stretch of curves, trestles, bridges, rock cuts and tunnels, with a topping of snowsheds here and there! We were lucky to flag down Xtra 8550 with three new C.L.C. Fairbanks-Morse road-switcher units at the head of 51 cars and 2200 tons.

These are part of a fleet of 10 H Line 1600 hp units, equipped with dynamic brakes and heating boilers. Slogging along out of Hope, Engineer Bob Swanah says these new units are faster and more

powerful than anything up to date, and we'll get to the top in less than scheduled time. The train left Ruby Creek at 7:45 A.M. and Hope at 8:10. Where the grades exceeded 2% for a short stretch, particularly on bad curves, we slowed down to below 12 mph, but nothing overheated and there was no wheel slipping all the way up, despite wet rail in spots. There are 12 tunnels, 6 high bridges and 8 snowsheds in the 36 mile uphill grind. Heavy snowfalls in the winter and long rainy periods the rest of the year, as warm Pacific winds hit the Cascades, make it a slippery railroad all the way. Steam power, because of curves, was limited to light engines with short wheelbase. Doubleheading and pusher service was a continuous daily operation. Uphill, the diesels run wide open and downhill operation calls for the dynamic brake at maximum capacity. The line is a continuous 2.2% grade with curves up to 12 degrees.

At Brookmere, 18 miles east of Coquihalla Summit, the line has already dropped 1,000 feet to Brodie, junction of the connecting line to Spence's Bridge on the main line, often used as a bypass when rockslides plug that line or as a detour when snowslides block Coquihalla Pass. Five miles of rising grade eastward, out of Brodie and Brookmere, end of the freight train crew's run, is reached. From there it is downhill all the way to Princeton, at 2,000 ft. elevation, then another spectacular climb of 10 miles of 2.2% grade to Jura, followed by 20 miles of 1% climb to Osprey Lake, then 40 miles down 1% and 2.2% grade to Penticton, on Okanagan Lake, in the sunshine heart of the Dry Belt fruit raising district. On the Osprey Lake-Penticton run, Engineer Lex Fulkerson keeps his dynamic brake on constantly the entire distance—better than 2 hours run, using air only once, near West Summerland, and for a full stop at Penticton at 6:05 P.M.

To get the full contrast of operating problems, we switch to passenger train #68, the Kettle Valley Express, leaving Penticton at 6:25 A.M. for the run to Nelson. Engineer Joe Collett, who came up

from a boy when the line was first built, and has operated everything from old coal burning teapots to the husky little Consolidations that lived their lives—almost 40 years—on the K.V. line because of their short wheelbase—and now to the latest diesel units on the whole CPR. Our diesel was a closed cab C.L.C.-F.M. two unit job, with heating boilers in both units. Almost directly at the station the line starts a 27 mile climb up the east bank of spectacular Okanagan Lake on a continuous 2.2% grade, to Chute Lake, then tapers off on a light minute 1% grade to the Summit at McCulloch, at 4150 feet, then down the long 1% grade for 78 continuous miles to Midway, at 1900 ft. elevation. Midway, close to the American border, is the junction of Kettle Valley and Kootenay Divisions.

At Midway, the line starts another steep climb on a straight 2.02%—2.30%—1.95% grade for nearly 20 miles, to elevation 3087 ft. at the top of Midway Range, then plummets down again 20 miles of 2.35% grade—steepest mainline grade on the whole route, to Grand Forks, then down some more on a gentler grade to Cascade, at elevation 1577 feet. Diesels are ending the helper and engine terminal at Grand Forks forever. Then—brace yourself, up again to the summit of the Monashee Mountains, on a 26 mile continuous climb of 2.30% grades to elevation to Farron, at 3976 feet, breaking through a short tunnel at the top of one of the world's most breathtaking views. Here at the top of Monashee Mountains, the line breaks over into the Arrow Lakes Valley, visible for 100 miles north, the Lakes being wide, calm spots in the mighty Upper Columbia, long and sharp like an arrow. From Farron the rails drop to elevation 1432 feet at Robson West, and the bridge across the Columbia to Castlegar. The entire 33 mile route is mostly a continuous 2.37-2.40% downgrade. The dynamic brake, full out, is able to hold the 12 car train without air, from the test stop at the summit to Robson West. But the last 25 miles into Nelson, again uphill, are still more climbing at full power up the 1 and 1.5% grades past the Kootenay power stations and dams.

An Alco-GE 1,000 hp yard switcher at work for the CPR.





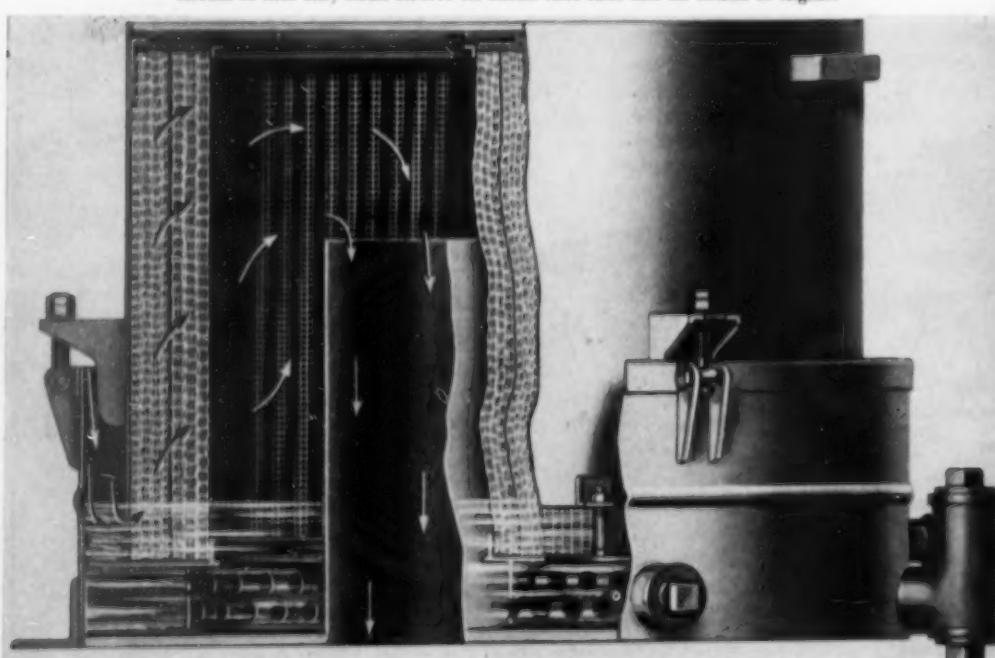
AIR FILTRATION FOR DIESEL LOCOMOTIVES

By BRUCE W. WADMAN

AS RAILROADS' experience in diesel locomotive operation and maintenance has increased, it has become evident that in many types of operation excessive engine wear has been an important problem. Proper air filtration of engine intake air is a key factor in successful engine operation, and a number of railroads in recent years have been studying engine wear problems with

special emphasis on inadequate air filtration as a primary source of high wear of engine parts. The best air filtration possible is needed on diesel engines in locomotive service not only for the well known and proven fact that fine abrasive particles in intake air can cause engine wear, but for the following reasons peculiar to diesel locomotive operation:

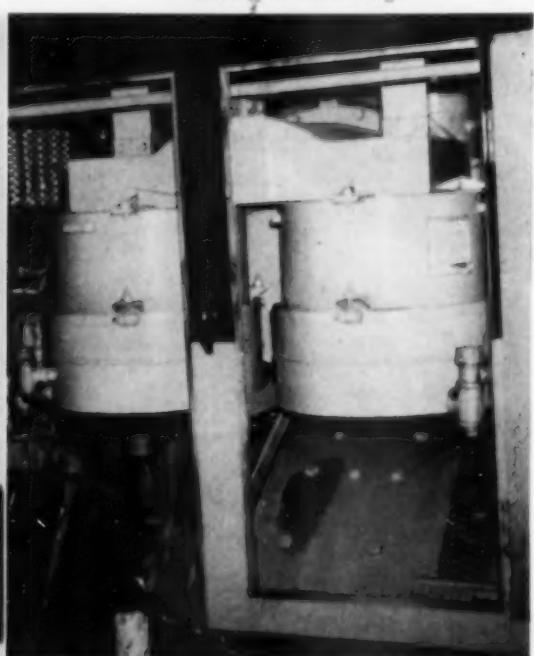
Cutaway of Air-Maze oil bath air filter with arrows showing the route of air flow through the filter. Dirt laden air is deflected by the skirt toward the oil sump. Air breaks the oil seal and changes direction, dropping larger dirt particles from the air stream. Increased air velocity as air turns upward into filter causes turbulent scrubbing action of air by oil, removing bulk of dirt particles. Oil is constantly carried onto diffuser screen and filter element by air stream, and washes down into sump any remaining dirt particles which have been impinged on the filter element, thus keeping it clean at all times. Filter element also removes entrained oil from air stream so that only clean oil-free air enters riser tube and air intake of engine.

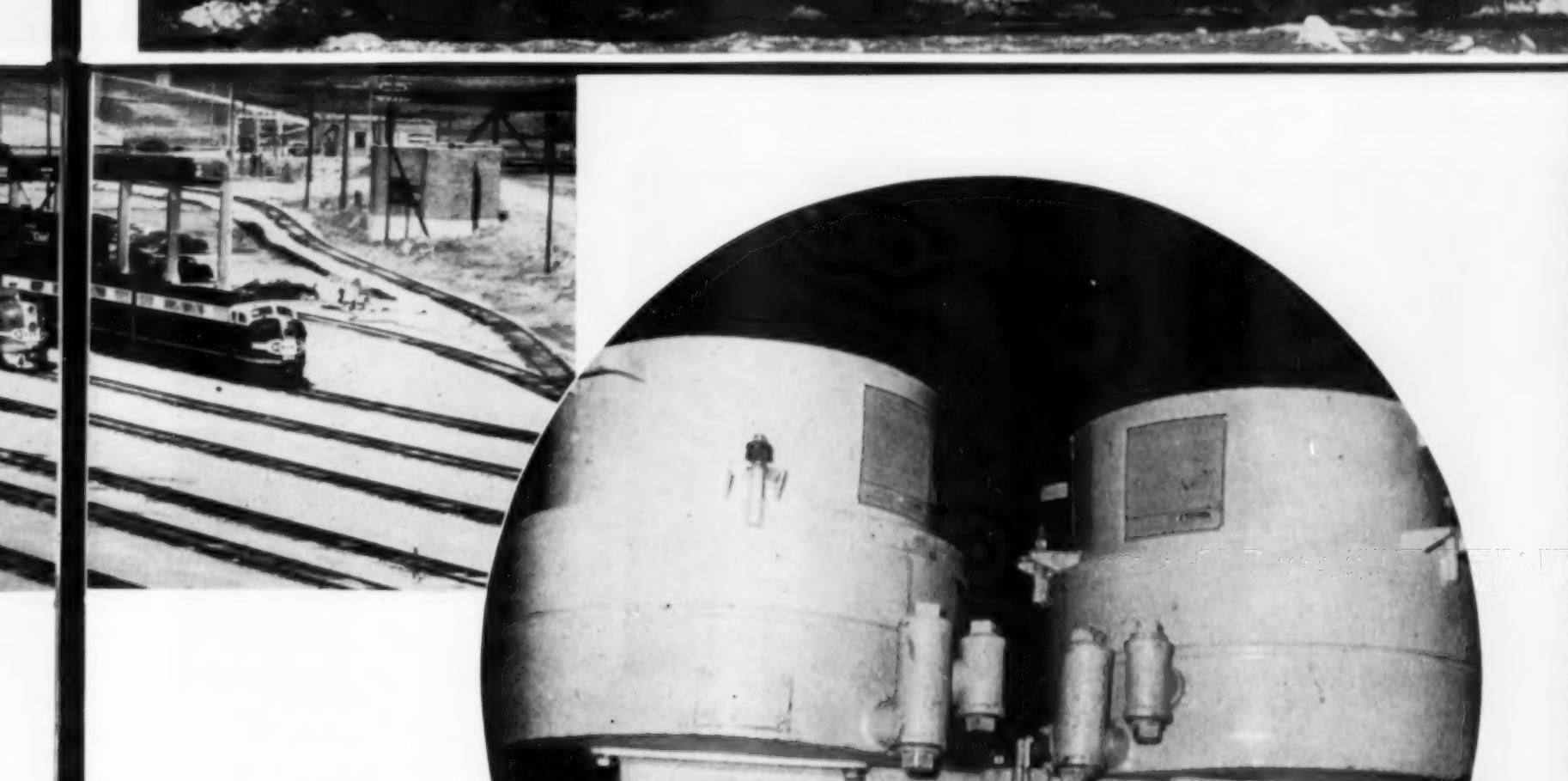


1.—Most locomotive engines are either the two cycle type or the four cycle turbocharged type. These engines, therefore, have very high air demands and a high volume of air flowing through the engine.

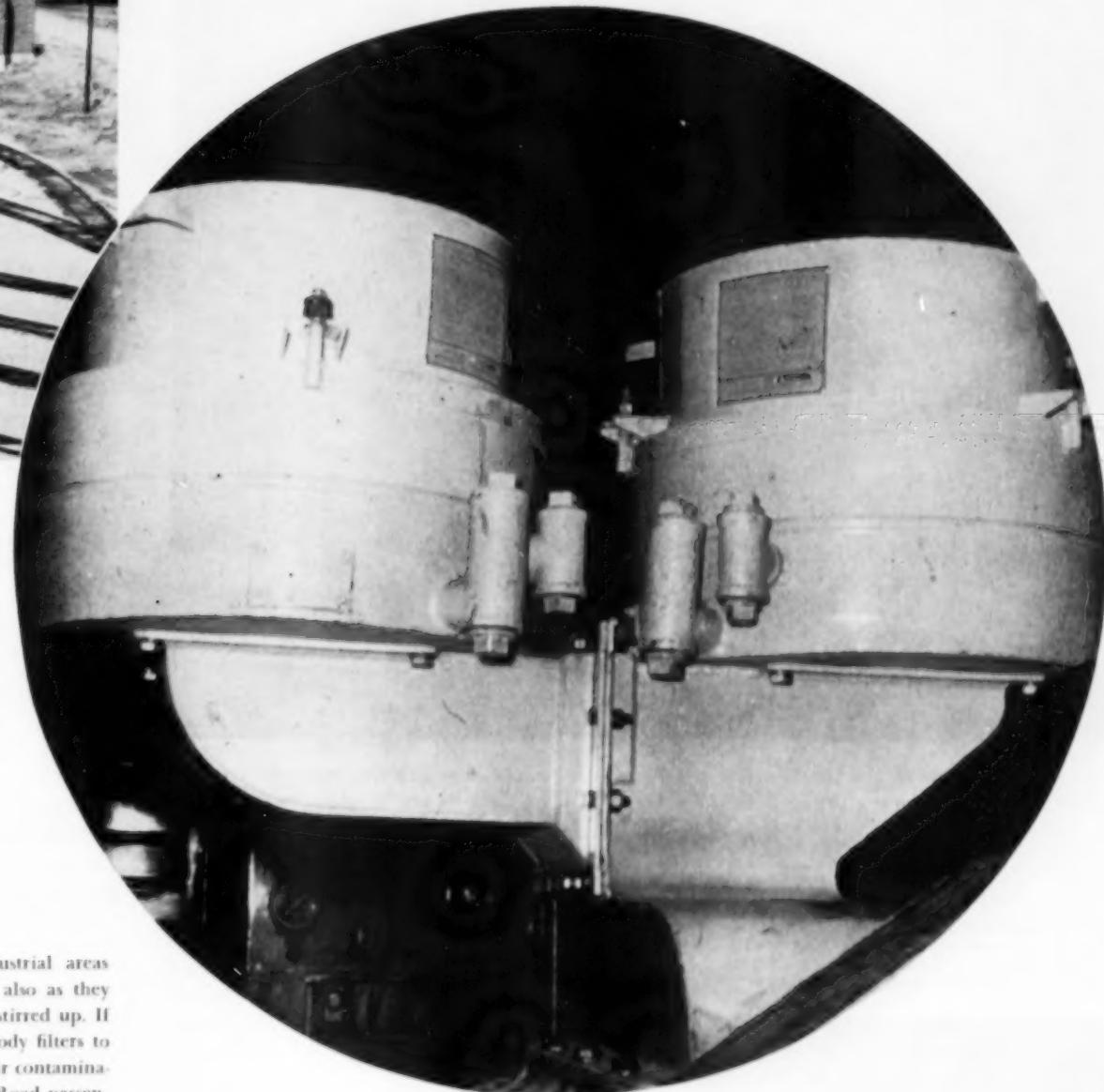
2.—Operating conditions are often in areas where a heavy potential damaging dirt load is present in the air, particularly for switchers, where so much of their operation is in terminal areas and in industrial applications like steel mills, cement plants, etc. For road freight and passenger locomotives air contamination problems are sometimes not as acute as for switchers, but these locomotives still

Alco 1000 hp switcher with two common Air-Maze oil bath air filters manifolded to the turbocharger.





EMD 1500 hp road freight locomotive with two identical Air-Maze oil bath air filters mounted above the blower and manifolds into one common blower intake.



spend much operating time in industrial areas where air has a high dirt load, and also as they travel at high speeds, roadbed dirt is stirred up. If the locomotive is equipped with carbody filters to intercept a part of this roadbed dirt, air contamination in the engine room is reduced. Road passenger and freight locomotives accumulate high monthly operating mileages—10,000 to 25,000 miles—and therefore, they take in a great amount of air. Although the air they take in is cleaner generally than in switcher operations, the road locomotive uses much more air in the same operating period, and the total dirt load presented to the air filter compares closely with a switcher operation in an area of higher unit dirt load in the air. It is important in all types of locomotive operation, then, to have the best possible air filtration at all times.

3.—Studies of switcher operation reveal full load operation at about 10% of total time operated and 90% between idle and full load. Road switcher operation—about 25% at full load and 75% between idle and full load. Road freight and passenger units operate at about 50 to 60% at full load and the remainder of time at intermediate loadings. These studies have shown the need for an air filter with a high relatively constant efficiency at all engine speeds and load conditions. Engine air requirements vary from about 30% at idle to 100% at full load. Generally each engine horsepower requires about 3 cfm. at full load for combustion and scavenging.

This article deals with the advantages and recent

experiences of oil bath air filtration systems on diesel locomotives. The oil bath air filter is not new in principle and has found wide and highly successful application in just about every type of diesel application, from large power generation plants to diesel trucks and construction equipment.

It is only within the last five years, however, that the oil bath air filter has been applied extensively to all types of locomotive operation, and its application in the locomotive required much development. First, the oil bath air filter had to be put into the existing locomotives types as offered by the various builders, and also its capacity had to be increased where space limitations were presented. It also had to be applied in such a way that attention and servicing could be accomplished readily. During 1951, the initial application was made to a 1500 hp. road switcher. Road data has been accumulated and design has progressed so that at the present time about 25 road proved models are in service on over 40 locomotive types, including switchers, road switchers, road freight and passenger units and representing all major builders. Over sixty railroads are involved in the filter's evaluation.

Previous to oil bath air filter applications on diesel locomotives, the panel type or "oil wetted" type of air filter had found the widest usage in locomotives, and still are used most widely today.

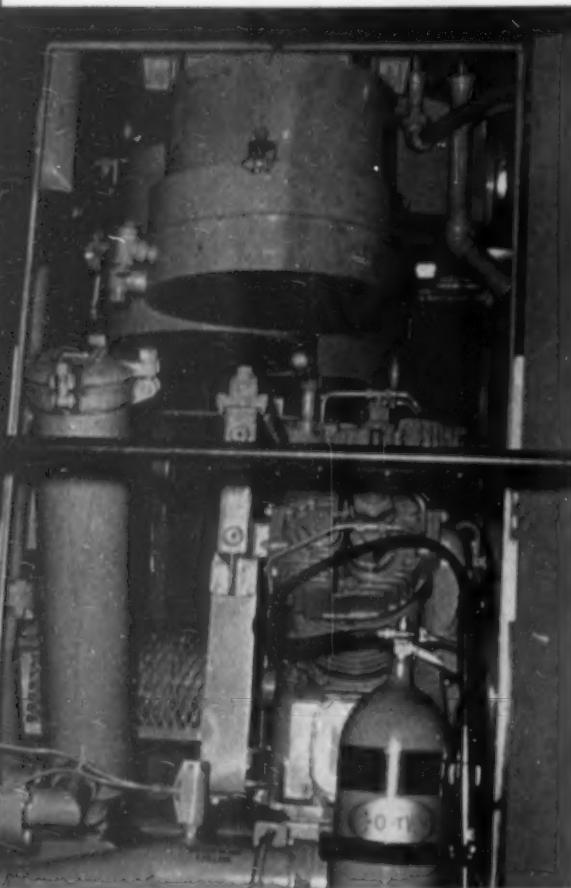
The oil bath air filter offer the following principal advantages in locomotive operations: 1.—Minimum engine wear and lube oil contamination due to the inherent high uniform filtering efficiency. Contaminated air must contact the oil and pass through a freshly and constantly oiled efficient steel media. In so doing, air direction changes assist in removing the air contaminants. This arrangement reduces to a minimum the airborne dirt entering the engine to cause engine wear and contaminate the lube oil.

2.—Long operating periods between servicing and thereby reducing filter servicing expense. Normal maintenance on an oil bath air filter in a locomotive consists of periodic filter oil changes from 90 to 180 day operating periods, depending on the degree of dirt contamination in the outside air, and removal of bowl deposit coinciding with annual locomotive inspection. The oil used in the filter is generally the same type as used in the



EMD 2250 hp road passenger locomotive with a single Air-Maze oil bath air filter mounted above the blower.

Alco 1600 hp road switcher with three Air-Maze oil bath air filters manifolded to the turbocharger. Nugent tube oil strainer can also be seen.



engine lube system. Winter operation may suggest use of a lighter oil like SAE 20. These service features are important especially where a locomotive is operating in outlying areas for an extensive period and where extreme air contamination is present that would cause frequent changes in filter elements of the panel type, with accompanying high filter maintenance expense.

Typical of railroad evaluation of oil bath air filter systems, the Illinois Central Railroad decided in 1953 that rapid engine wear was traceable to wear-producing dirt entering the engine air intake. This was accentuated by inspection of a switcher, equipped with panel filters, which required complete power assembly changeout after nine months operation in an industrial area where it serviced a soybean processing plant and a cement mill. The decision was reached to equip the locomotive with an oil bath air filter and also apply carbody filters. After a 17 month operating period in the same district, an inspection was made of the power assembly reflecting the greatest wear. This revealed top liner wear of .001 inch, with hone marks still visible in the liner walls, and all compression rings in good condition, the increase in the gap of the top ring being .025 inch.

To round out its evaluation, the Illinois Central also equipped one engine of a 2250 hp. passenger locomotive with oil bath air filters in 1953, after operating the unit nine months with panel filters. Recently, after about 800,000 miles operation, an original power assembly was inspected and the top liner wear was found to be .0075 inch, the compression rings in good condition having the indicating ferrox grooves visible around the entire periphery.

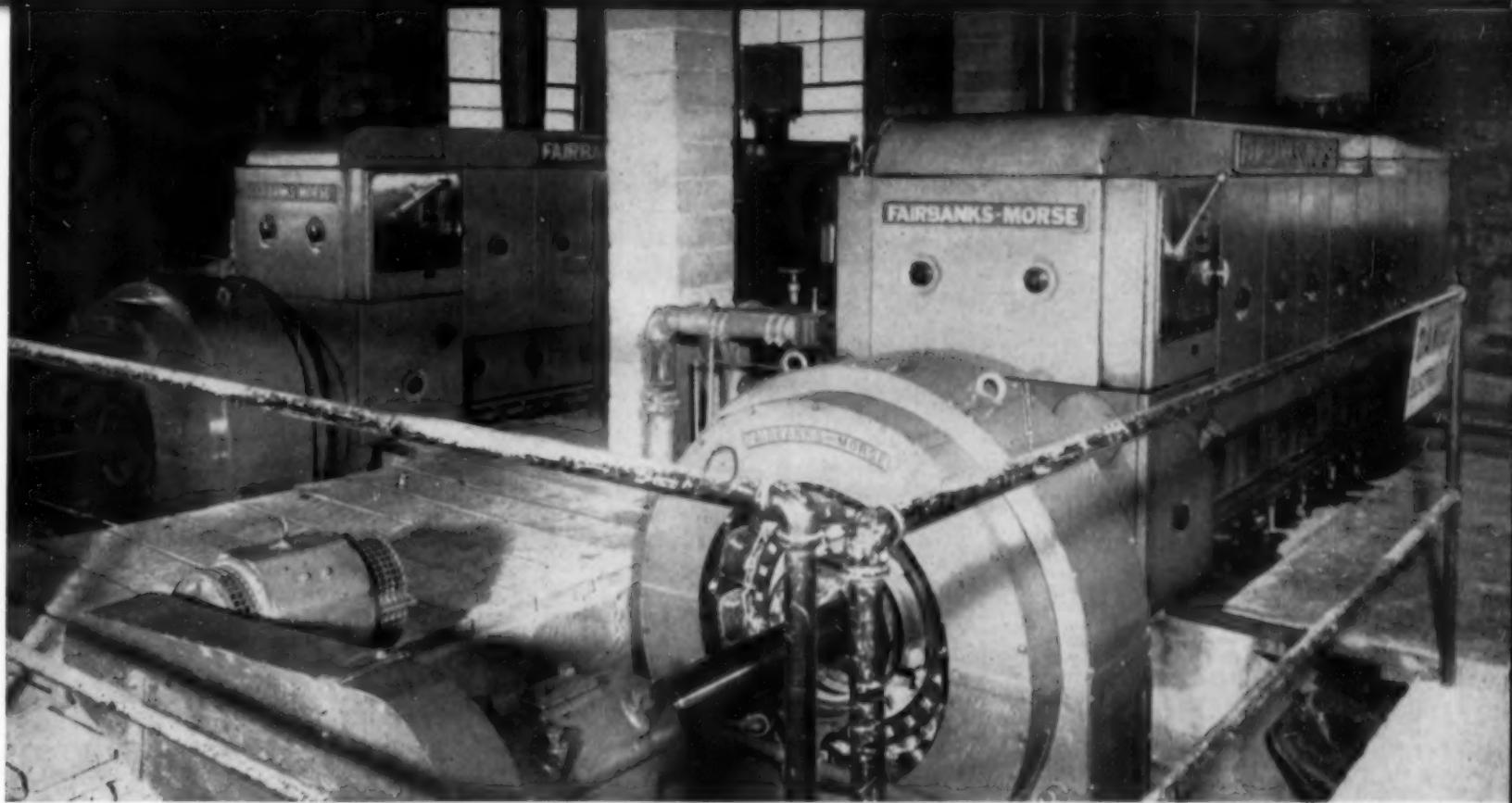
Early in 1954, a 1500 hp. road switcher was equipped with an oil bath air filter and at present has accumulated about 200,000 miles. Inspections indicate an excellent internal condition. As a result of thorough evaluation of the oil bath air filter in switching, road switching, and road passenger service, the Illinois Central is currently receiving seventy 1750 hp. road switchers equipped with oil bath air filtration systems.

Air-Maze Corporation has done a great deal of work in applying the oil bath air filter to diesel locomotives, and illustrations in this article show installations of these filters in various locomotive types. A short discussion of the Air-Maze principle of oil bath filtration will serve to illustrate the general principles of oil bath air filtration. Air-Maze uses the air velocity to engage oil and carry it on a very efficient steel media, where dirt is removed from the air stream and conveyed to the sump or bowl by an oil bath or wash action. The steel media or filter element also separates the oil and air, so that oil free air is conveyed into the engine. Thus, the steel media is constantly oil bathed and remains clean indefinitely, if filter oil is changed at proper intervals, and air cannot go through the filter without engaging oil as it passes through the filter element. Filter oil changes can be made in place without dismantling the filter and there is provision to permit "in place" determination of bowl deposit depth.

Basically, the oil bath air filter as applied to locomotives consists of one or more filters manifolded so that it can be readily connected to engine blower or turbocharger. Design has been stabilized so that common filters are used for various locomotive types produced by a respective builder. Air capacities currently handled range from 2000 to 8700 cfm.

It will be well to mention, also, the advantages of carbody filters on locomotives. The carbody filter will allow the engine air filter to require less frequent servicing and a cleaner engine room condition should result, with less dirt being drawn into the electrical rotating equipment due to the pre-cleaning effect of the carbody filters.

Selection of any equipment like air filtration equipment for use on a diesel locomotive depends on the actual operating economy that can be obtained. Surrounding conditions of a particular locomotive operation dictate the degree of protection needed for the engine from the various accessories provided for that purpose. The types of air filters currently in use on diesel engines can all be used effectively under operating conditions best suited to their particular design features. The oil bath air filter principle and application to diesel locomotives is an important phase of the air filtration picture and offers an effective solution to many air filtration problems. Good air filtration is one of the most necessary protective accessories for diesel engines, particularly as new engine developments point to higher and higher air demands, and also the use of the most efficient air filtration devices will permit railroads to operate locomotives longer periods between major overhauls because of reduced engine wear, thus contributing to lower operating costs.



Each of these Model 31AS½ Fairbanks-Morse 6-cylinder diesel engines drives a 350-kva, 245-kw alternator. Also shown are: the one-lever control panels, the Air-Mate air intake filters, and the Woodward governors.

QUARRY LOWERS POWER COSTS BY DIESELIZING

By DOUGLAS SHEARING

THE decision to construct a diesel plant at one of its two limestone quarries near historic Cumberland Gap is paying off in decreased operating costs for the Kentucky-Virginia Stone Co., Inc., of Middlesboro, Ky. Despite a widely fluctuating load at the quarry, the two 360-hp Fairbanks-Morse diesels installed are delivering dependable power at a cost well below the projected cost of purchased power and substantially lower than the company's previous steam plant operating cost.

W. B. Paynter, Jr., vice president and secretary, reports that the decision to generate company power at this quarry was made chiefly because of the high demand charges that would have been encountered had purchased power been brought in. The motor-driven conveyors, crushers and other equipment at the quarry are operated sporadically with frequent starts and stops, which is characteristic of quarry operations, and the result is a power load marked with closely spaced peaks and valleys. Power factor penalties, due primarily to the quarry's remote location, also influenced the decision to construct a diesel plant.

In 1954, the two diesel engines alternated on a five-day, 40-hour per week schedule, recording a combined total of approximately 2016 hours of operation. In this 12-month period they produced a total of 278,950 kw/hrs., representing an average hourly load at the power plant of 133 kw. Since each Fairbanks-Morse diesel drives an alternator

rated at 245 kw, the load factor reflected is only about half engine capacity. Peaks ranged above 245 kw, which means that each engine was frequently called upon to operate under overload conditions and valleys often fell below 100 kw.

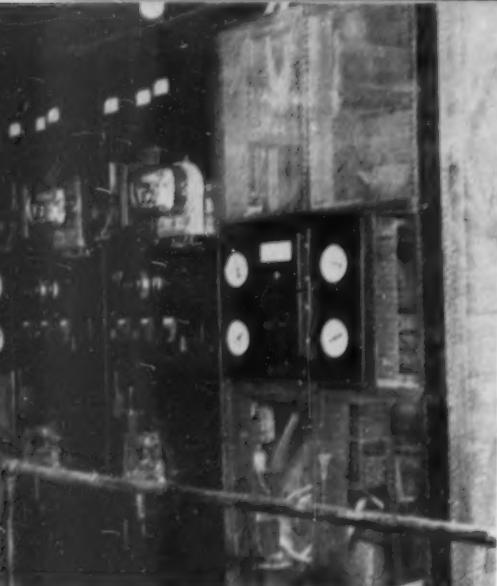
The Kentucky-Virginia Stone Co. is a major supplier of crushed limestone for southern highway construction, railroad ballast and industry. The company maintains two quarries in the vicinity of Middlesboro, one at Pineville, Ky., about 12 miles to the west, and another at Gibson Station, Va., about the same distance to the east. The Pineville quarry is a small roadside operation producing about 500 tons of stone per day. Power for its crushers and other motor-driven equipment is purchased from Kentucky Utilities at an average cost of 2.50 cents per kw/hr., including demand charges. In 1954 a total of 166,700 kw/hrs. was purchased at this rate.

The Virginia quarry, where the two Fairbanks-Morse diesels are installed, is by far the larger of the two, producing between 1000 and 1500 tons of crushed stone per day, or more than 300,000 tons per year. Originally opened in 1913, the quarry is located on a 15-acre hill in the Cumberland mountains, unlike most limestone quarries, which are generally found in river basins. The Kentucky-Virginia Stone Co. acquired the site in 1929 and in 1942 stripped and cleaned a second quarry at the same location. All crushing, elevating and

screening equipment in the original tipple was driven through a system of main and jack shafts by a reciprocating, low-pressure steam engine. The drive was via an old fashioned flat transmission belt. This system was continued in operation until 1944, shortly after the second quarry was opened.

At that time a rocking valve-type Corliss steam engine was installed and the original hand-fired boilers replaced with stoker-fed boilers of 100, 125, and 225 hp, respectively. Steam remained the principal source of power at the quarry during World War II and throughout the early post-war years. Due principally to the rising price of coal, operating costs continued to mount from year to year.

By 1950, a post-war boom in highway construction was sweeping through the eastern portion of the country and, to meet increased demands for crushed stone, Kentucky-Virginia converted its old tipple into a secondary crushing plant and constructed a new primary crushing, elevating and screening system ahead of it. The new system feeds stone to a surge pile, which in turn feeds the secondary plant. The installation of new equipment meant that additional power was needed at the quarry. Officials decided against expansion of the existing steam facilities because of the high capital investment and high operating costs involved. At the same time a study of the rate structure offered by the local power company, including demand charges and power factor penal-



Power is controlled at the quarry plant at this two-panel switchboard, equipped with Roller-Smith circuit breakers and Westinghouse totaling kw/hr meters. Panels contain Alnor exhaust pyrometers and Marshalltown pressure gauges.

ties, convinced them that modern diesel equipment offered the best possible solution.

Accordingly a power plant was constructed near the old No. 1 quarry, which had been transformed by rain water into an artificial lake, 90 feet deep. Two 6-cylinder Fairbanks-Morse Model 31A8½ engines were installed, each unit rated at 360 hp at 514 rpm and driving a 350-kva, 245-kw, 3-phase, 60-cycle, 480-volt alternator. V-belted to each generator shaft is a 5-kw, 125-volt dc exciter. Two engines were installed to guarantee 100% standby capacity and to provide for future expansion. In April, 1951, the final phase of the project was completed and the two diesels began to carry the quarry's full load.

Fuel oil is delivered at the power plant by tank truck and is metered as it is unloaded into a 2114-

"Shot" rock is loaded by diesel-driven shovels into 15-ton, dieselized Euclid rear-dumps which haul it to the jaw crusher where unloading is done as shown in photo below.

gal. underground storage tank. From storage, fuel flows through full-flow strainers to the individual engine-driven supply pumps, reaching the injection pumps and nozzles through duplex, bag-type filters. There are no day tanks. Metered oil from storage also is used in diesel-fired stoves to heat various buildings throughout the quarry.

A high-detergent type lube oil is circulated under pressure through the engine by built-in, engine-driven pumps. As it leaves each engine it passes through a full-flow strainer, through a manually-controlled proportioning valve, through a shell-and-tube type cooler and then back to the engine. A by-pass on the pressure side of the engine-driven circulating pump directs a continuous supply of lube through a three-cartridge, cellulose-packed filter, providing added protection. So effective is this filtering arrangement that no oil change was considered necessary during the first four years of plant operation. Even then, W. Guy Moore, plant operator, reports that the lube was just as "pretty" as when first put in.

Jacket water makeup is drawn from the nearby lake by a 2-in., 7½-hp motor-driven pump and is treated in a water softener before being added to each engine's closed system. An engine-driven pump circulates water through each engine and through a shell-and-tube type heat exchanger for cooling. Raw water for the lube coolers and heat exchangers is drawn from the same artificial lake and is collected in a 17½x10½x5-ft. hot well located outdoors against the plant's north wall. Should lube oil or jacket water temperature run high, the discharge from the engine-driven circulating pump is sprayed over baffle boards which enclose the hot well on all sides. This provides the additional cooling needed.

Filtering the scavenging air for each engine presents a problem in all quarries, due to the high dust content of ambient air. Kentucky-Virginia

solved this problem by mounting the impingement-type intake filters on the engine frames, rather than outside, and by changing the filter elements at least once a week. Exhaust gases are expelled through vertical silencers rising through the roof of the plant. Starting air is supplied at a pressure of 250 lbs. by a two-stage compressor, V-belted to a 3-hp, 1735-rpm motor.

This is a one-man plant, a factor which has helped minimize operating expenses. Actually, only a portion of Mr. Moore's salary is charged to the operation of the two diesels. In the morning, after putting one of the engines on the line, he generally goes down to the maintenance shop where, as a mechanic, he is responsible for the service and repair of much of the quarry's equipment. Actually, if the quarry operated on purchased power, Mr. Moore would be retained as a full-time mechanic with no reduction in labor costs. In the meantime, the heavy-duty engines run unattended. Should jacket water or lube oil temperature run high, or if lube oil pressure should drop, an automatically-controlled siren mounted on the plant roof warns Mr. Moore to come a-running. Each En-Bloc engine generally carries the quarry's full load for a 5-day, 40-hour week, the second engine taking over the following week. This permits Mr. Moore to check each unit when he has the time, maintaining both in top operating order.

As in most stone quarries, operation is divided into stripping, quarrying and crushing. In the first phase, the top 20 feet of overburden is removed by drilling and shooting, diesel-driven shovels and

This is an overall view of the Kentucky-Virginia Stone Co. quarry near Gibson Station, Va. It is equipped to produce 1500 tons of crushed stone each working day.



trucks stripping the quarry down to clean rock. Once this is done, rotary wagon drills bore vertical blast holes, into which dynamite is packed. The clean rock is then "shot" into convenient sizes and is loaded into 15-ton trucks by shovels with a 1½ cu. yd. bucket. These trucks haul the "shot" rock up to the jaw crusher located near the new plant.

In the motor-driven jaw crushers, the rock is reduced to less than six inches in diameter. A conveyor belt carries the stone produced to a double-deck screen, the top one having six-inch openings and the bottom 1¼-in. openings. Oversize stone is returned to the jaw crusher. Passing through the 1¼-in. screen, stone is belt-conveyed to a second screen with ½-in. openings. Here it is classified into two sizes, one bin holding ½-in. to 1¼-in. rock and the other bin sizes less than ½-in. diameter. Rock between 1¼-in. and 6-in. in diameter is belt-conveyed from the double-deck screen to a surge pile, which feeds the secondary crushing plant or tipple. Here four sizes can be prepared at one time although a total of 40 different sizes can be achieved by rerouting the stone through the crushers. Such a wide variety of sizes is sometimes necessary because of the size differentials specified by individual states.

Stone from the surge pile reaches the secondary plant through a tunnel and goes directly to three reduction crushers. The discharge from the gyratory crusher is carried via a bucket elevator to a four-deck screen, while the discharge from the hammer mill and cone crushers goes to a surge bin and is then belt-conveyed to a five-deck screen. Stone



This concrete block power station was constructed in 1950 to house the two 360-hp Fairbanks-Morse diesels which run the plant at a lower cost than purchased power.

trapped in the fifth deck, with 1¼-in. openings, is returned to the crushers. All other stone passes through the remaining screens and is classified and stored for shipment in four bins, one for ½-in. to 1¼-in. stone, the second for ½-in. to ½-in. stone, the third for No. 10 mesh to ½-in. stone, and the fourth for 0 to No. 10 mesh stone. Normally, the Virginia quarry maintains 10,000 to 20,000 tons of stone in storage at all times. Outshipments are made by truck.

In addition to the facilities described, the quarry also maintains a cleaning machine, which is used only occasionally, according to the condition of the rock. When in operation, stone from the jaw crushers passes through the cleaning machine on motor-driven belt conveyors and is washed in the discharge of a 5-in. centrifugal pump, driven by a 65-hp, 1200-rpm Fairbanks-Morse diesel engine.

The Kentucky-Virginia Stone Co. is one of the South's leading suppliers of crushed stone for highway construction, railroad ballast and industrial use. In addition to the cost savings introduced, the

company's new diesel plant guarantees a dependable source of power, independent of outside sources and protected against the threat of line outage or other power failure.

List of Equipment

Main engines—Fairbanks-Morse Model 31A81½, 6-cylinder, 8½-in. bore, 11½-in. stroke, diesel engines, rated 360 hp at 514 rpm.

Alternators and exciters—Fairbanks-Morse.

Governors—Woodward.

Fuel oil filters, duplex—Purolator.

Fuel oil strainers, full-flow—Sarco.

Lube oil filters, by-pass—Fairbanks-Morse.

Lube oil filters, full-flow—Cuno.

Lube oil coolers—Kewanee-Ross.

Lube oil—Valvoline.

Jacket water heat exchangers—Kewanee-Ross.

Air-intake filters—Air-Maze.

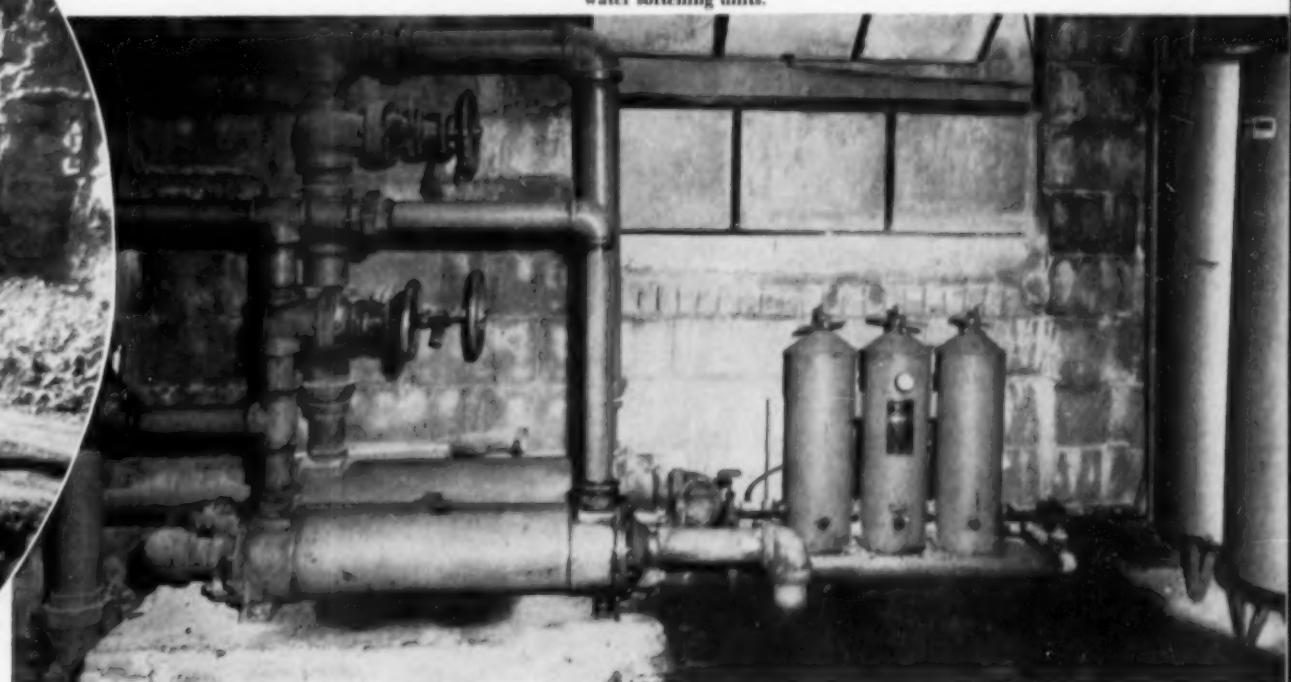
Pressure gauges—Marshalltown.

Exhaust pyrometers—Alnor.

Circuit breakers—Roller-Smith.

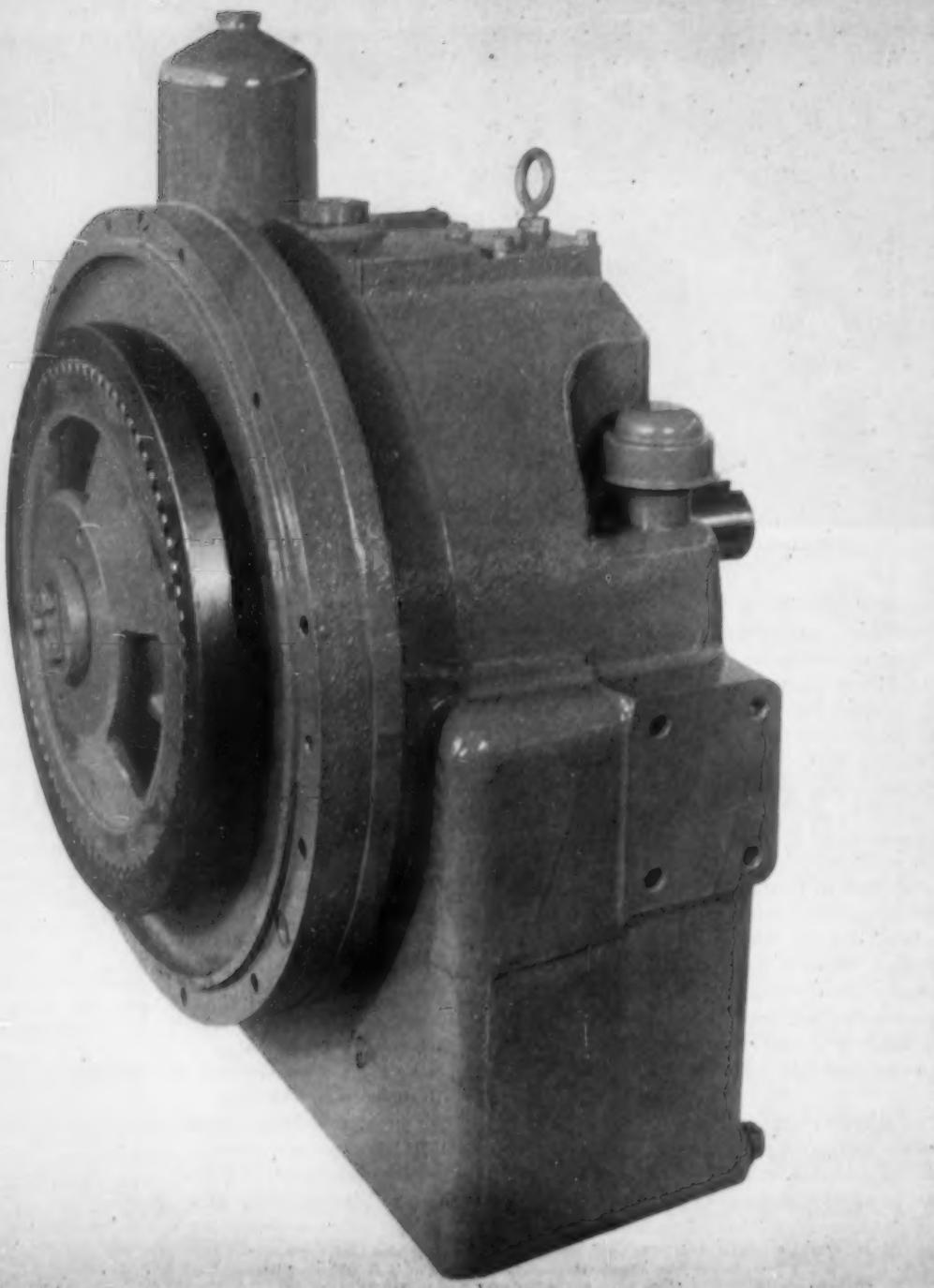
Totalizing kw/hr meters—Westinghouse.

The horizontal Ross lube oil cooler and jacket water heat exchanger shown here serve the No. 2 F-M diesel. Also shown are the three-cartridge F-M by-pass lube oil filter and the water softening units.

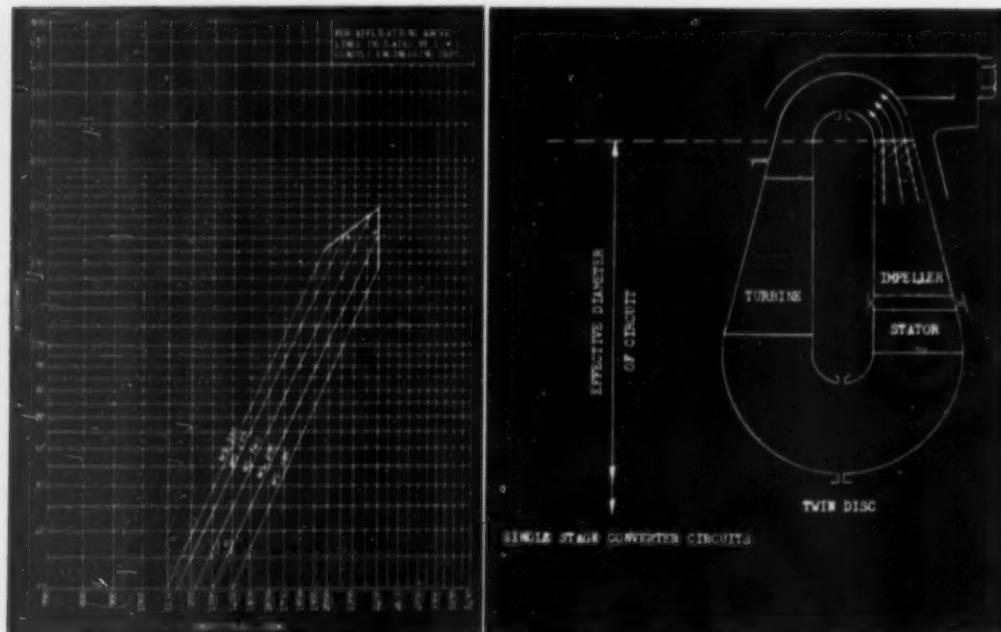


NEW SINGLE STAGE TORQUE CONVERTER

By W. H. BODE



The new Twin Disc 1500 series single stage torque converter with input side showing.



THE production of a new single stage torque converter has been announced by Twin Disc clutch company, one of the well known hydraulic drives manufacturers serving the diesel industry. This new 15 inch single stage torque converter adds to and complements the Twin Disc line of three stage torque converters and fluid coupling drives.

This is the first of a new line of single stage units and is identified as the 1500 series. It has undergone several years of extensive field tests, and is a brand new design originated by Twin Disc, with a number of unique features in its design and operation. This new converter features "unloading" of the engine through an exclusive blade design wherein the turbine develops a counterhead which stops fluid circulation at high speed ratios. This provides for simplified construction by eliminating the need for a free wheeling stator or some other device for "unloading" the engine at high speed ratios. Simplified and low maintenance also result from this feature.

Another important feature is that impellers having different bladings—both number of blades and blade pitch—are interchangeable. This permits the converter's torque capacities to be matched very accurately to engines of various horsepower outputs and speeds, within rated limits, without requiring changes in the converter housing or other components.

Minimum and maximum ranges of the torque converter are respectively, 30 hp. at 1150 rpm. and 198 hp. at 2400 rpm. Specific torque ratings are 165, 200, 285 and 330 lb. ft. depending upon the impeller blading selected by the user. Input horsepower and speed throughout the converter's entire range is shown in the accompanying horsepower capacity chart.

Twin Disc's initial production includes these four models:

For left. The Twin Disc single stage torque converter horsepower capacities.
Left. Diagrammatic drawing showing the single stage converter circuits.

**One of the Well-Known
Manufacturers of Hydraulic
Drives**

**Places A New Single Stage
Torque Converter on the
Market**

1.—Model "C" with clutch input. The Model "C" arrangement is offered with either a Twin Disc SP-111 clutch or an SP-114 clutch. This is an economy feature which permits use of a more closely matched clutch for those customers with engines in the lower horsepower range.

2.—Model "S", with spider drive input. The spider drive on this unit uses the same drive ring as the SP-111 clutch, and, therefore, the same flywheel can be used.

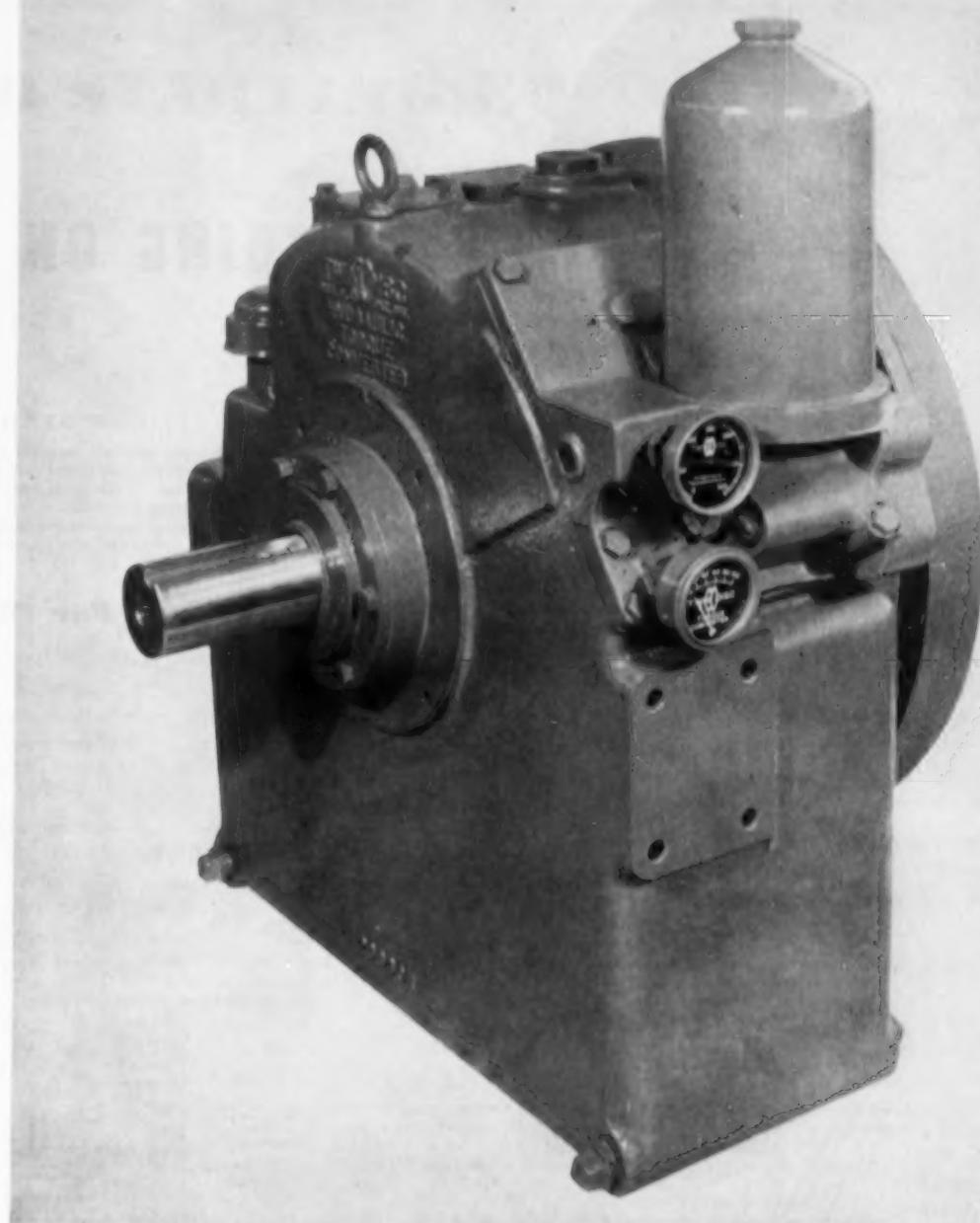
3.—The Spacer-Type Model "S", with a double-ended SAE housing. This model is equipped with a double ended SAE housing, No. 2 to No. 2, with a No. 1 to No. 2 available. This unit uses the same input spider as the Model "S".

4.—Model "U", with flange input and flange output. The Model "U" arrangement is designed for applications where it is desirable to use universal joint or flexible coupling drives.

SAE No. 2 and No. 1 flywheel housing adapters are available for both Model "C" and Model "S" units. Where the Model "C" is equipped with the SP-111 clutch, only the SAE No. 1 housing adapter can be used.

The addition of this new 1500 series single stage torque converter to the Twin Disc line gives them a complete product list of hydraulic drive components for every type of diesel torque converter application. This single stage unit is designed for application in such equipment as shovels, yarders, front end loaders, bucket loaders, and industrial lift trucks—to name a few. New product developments of this type also reflect the great interest among manufacturers and users of all kinds of diesel equipment in transmissions that incorporate the many advantages of torque converter drive, and who thereby promote development of torque converters and converter transmission combinations to meet their requirements.

Specifications chart showing the Model C with clutch input, Model S with spider drive input and Model U with flange input and flange output. Dimensions are in inches for the size of the Models.



Twin Disc single stage torque converter showing output side. Note compact and rugged construction of unit.

TYPE	MODEL	DRIVE RING	CLUTCH	SAE MSG. SIZE		DIMENSIONS		
				INPUT	OUTPUT	LENGTH "L"	OVERALL WIDTH	DEPTH "D"
CLUTCH	1-C-1502-1	6625-A	SP-111	1		18.25	24.15	12.75
	1-C-1502-2	6625-A	SP-111	2		18.25	24.15	12.75
SPIDER	1-C-1504-1	5712	SP-114	1		21.00	25.50	12.75
	1-S-1503-1	6625-A		1		12.63	22.65	12.75
	1-S-1503-2	6625-A		2		12.63	22.65	12.75
FLANGE	1-U-1505			(Mechanics Flange) 6-C or Equiv.	6-C or Equiv.	17.48	22.65	12.75



WHAT'S GOING ON IN ENGLAND

CONDUCTED BY BERNARD W. LANSDOWNE

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C., Ltd., Southall, following which he served some five years with that company's sales engineering department. He entered technical journalism as assistant editor of "Gas & Oil Power" in 1950 and was appointed editor in 1952.

New Cylinder Lubricator For Diesels

A PAPER* presented to the Institute of Marine Engineers in London recently by Mr. A. G. Arnold, chief superintendent engineer of the Blue Funnel fleet, gives details of his experiences with nine vessels which have totaled 75 voyages propelled by Harland & Wolff opposed-piston

two-stroke engines running on boiler oil. The author is a recognized authority in England on marine diesel matters and the engines discussed in the paper include both turbocharged and non-turbocharged designs.

*Some Experiences in Vessels Equipped with Two-stroke Cycle Harland & Wolff Opposed-piston Diesel Engines Using Boiler Oil.

In the light of experience gained since the engines were first run on heavy fuel, Mr. Arnold has introduced a number of design modifications to the engines, resulting in an acceptably-low level of liner

wear and generally-successful service on the cheaper grade of fuel. Space limitations preclude the discussion here of all the conclusions and design modifications outlined in the paper, but one item of particular interest concerns the system of cylinder lubrication now employed on the engines.

When first installed, the Harland & Wolff units were fitted with cylinder lubricators of the usual mechanical type with sight-feed control, timed discharge and points of admission in the orthodox position, as shown in Fig. 1. From his experiences outlined in the paper, the author proposes to move the point of admission of the lubricant to the position shown in Fig. 2, and also to utilize a new type of lubricator developed by Wilson & Kyle, Ltd., Brentford, Middlesex. The construction of the new lubricator and its quantity-control arrangements are shown in Fig. 3, and by delivering the lubricating oil to a point high in the cylinder wall when the piston is nearing the top position just before combustion commences, will ensure that the piston and cylinder liner are lubricated at the most beneficial time, which should result in

... and now please turn to page 57 ...

Fig. 3. Sectional arrangement of the Wilson & Kyle pressure operated cylinder lubricator.

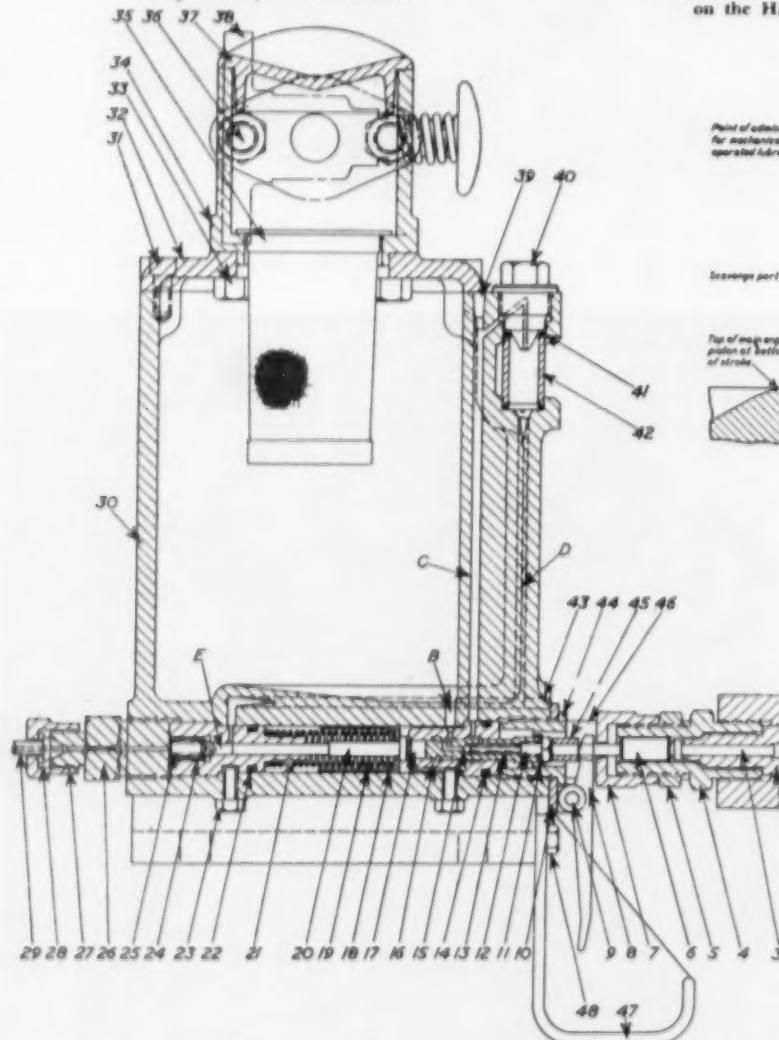


Fig. 1. Showing the original points of admission for cylinder oil into the liner on the Harland & Wolff engines.

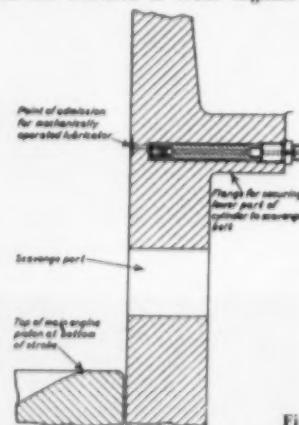
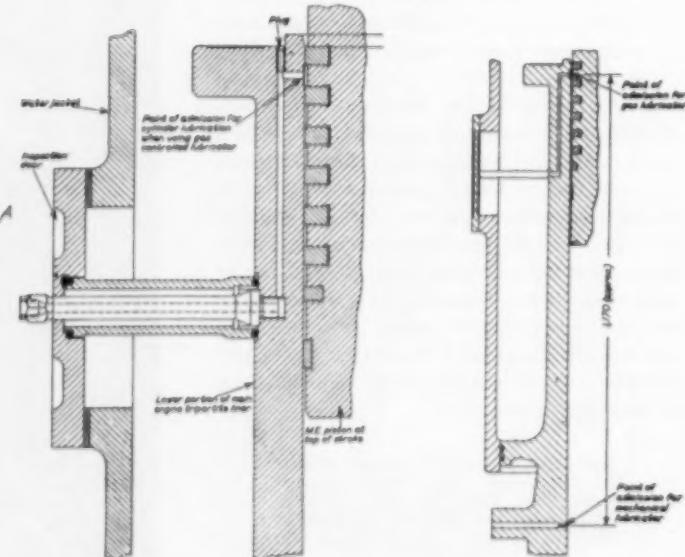


Fig. 2. The arrangement of the cylinder lubricant admission point with the new arrangement using the Wilson & Kyle lubricator.



DIESEL COLD STARTING EQUIPMENT

**The Start Pilot Is A
Complete Unit For
Starting Either Diesel or
Gasoline in Temperatures
Down To -70° F.**

THE Start Pilot Corporation is marketing a new diesel engine starting device, called "Start Pilot." This device is capable of assuring a quick start with all types of diesel engines in two to five seconds, even at temperatures up to -70° F.

"Start Pilot" has been designed to overcome the principal starting difficulties which are most common during extreme cold or humid weather conditions. The soundness of its design demonstrating a new starting approach has been proven under severe test conditions and in thousands of actual installations into engines up to 750 hp., including General Motors, Hercules, Continental, Mack, Enfield, Petter, Cummins, etc.

"Start Pilot" is a small, compact unit, consisting of a double-action air pump, fuel and moisture chambers. This easy to install unit can be mounted on the dashboard or the control panel of any industrial equipment powered by a diesel engine. It can also be used on large gasoline engines for industrial, truck or marine uses.

The Start Pilot fluid is supplied in aluminum throw-a-way capsules, sealed by cold-pressure welding and is not affected by low temperatures. Many years of experience in the manufacture of this type of packaging has enabled the Start Pilot Corp. to market a completely leak-proof capsule. The Start Pilot fluid will also be available in bulk containers of $\frac{1}{4}$ pint, $\frac{1}{2}$ pint, quart and in a pressurized spray-can for application on lawn mowers, cut-board engines, etc.

The Start Pilot Fluid contains a lubricating element and a corrosion inhibitor, which protects the cylinder bores in the early stages of running.

The capsule is inserted in a chamber fitted with an air-tight cover, which has a piercing mechanism to release the fluid. A double action hand-operated airpump creates a constant flow of atomized mixture, which is forced through a jet-nozzle into the air intake, the nozzles being screwed into the engine manifold.

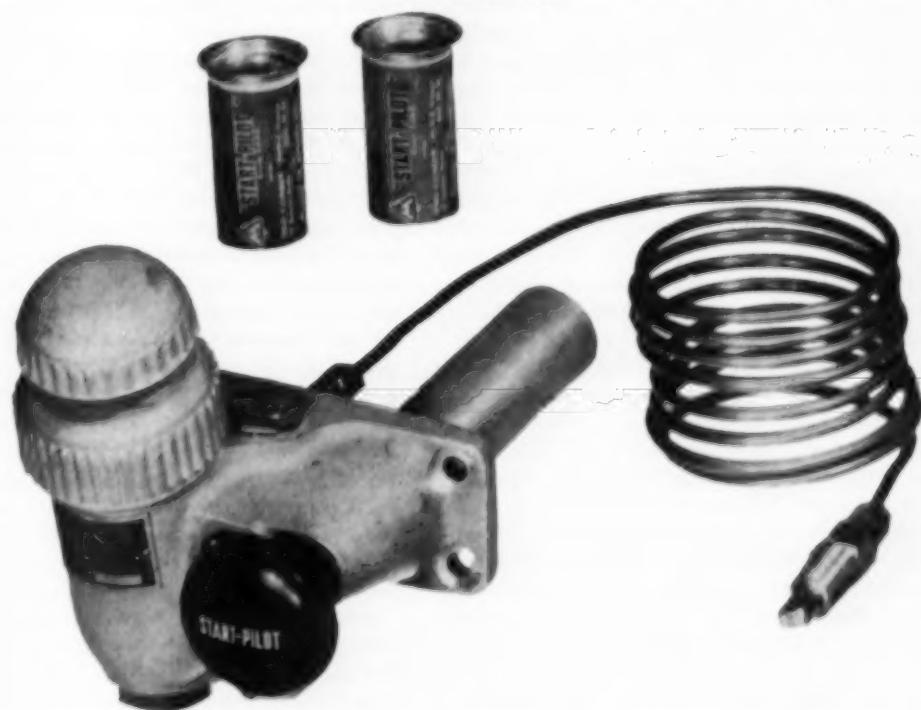
Both the Start Pilot device and the capsules are inexpensive and the standard model can be used on engines up to 400 hp. Under average cold starting conditions each capsule will give up to 5 starts.

In the United States, the Start Pilot Device and the Start Pilot capsules are being sold through the Start Pilot Corporation of Mineola, New York and the Wilco Company of Los Angeles, California. In Canada, distribution is handled by Lansair, Ltd. of Montreal, P.Q.



This illustrates the double action air pump which is used to inject the Start Pilot starting fluid into the manifold of a cold engine. Note the plunger which pierces the leak-proof capsule. The entire assembly can, of course, be attached to the instrument panel of a truck, bus or tractor, or to any convenient location around the engine that needs to be started.

The Start Pilot injection Device showing the nozzle which is screwed into the engine manifold. The Start Pilot leak-proof capsule is here illustrated containing enough liquid to give at least five starts.





EASTERN DIESEL OBSERVATIONS

A COMMENTARY BY ARNOLD B. NEWELL

Arnold B. Newell, a third generation American, was born near Seattle, Washington of pioneer stock. He obtained his engineer's license at 21. Sailed as chief engineer on one of the first ocean-going motorships built in the U.S.A. In 1924 he joined New York Shipbuilding Company in diesel advisory capacity, tested and took to sea New York-Werkspoor diesels, supervised operation of shipyard owned vessels, then in 1927 joined Ingersoll-Rand as diesel field engineer. Became associated with "Motorship" in 1929. Subsequently became managing editor of "Motorship" and "Diesel Power," then vice-president and general manager.

Why Not Super Ferry Boats?

INTERESTING ferryboats have been commissioned recently despite the fact that a few good ones have been placed on the market as the result of bridge construction. For example, Maryland sold some to the State of Washington. However, ferryboat tonnage on the market fails to meet current demands. Therefore, building modern diesel propelled ferries is not on its way out as some operators seem to believe. Many ferry routes can not be bridged. Highway congestion becomes worse. In many cities waterfront facilities are no longer fully employed. This all adds up to greater utilization of diesel driven ferryboats. Another factor is the need to extend the travel convenience of the expressway to include unbridgeable water crossings.

With the right kind of ferryboats, transportation by water could be made fast enough and cheap enough to attract the public. We cannot blame the public for turning up collective noses at the ramshackle old contraptions retained in service on many routes by owners who look upon their boating enterprises as a bad job becoming worse. Slow, uncomfortable, dirty, with steam machinery obviously on its last legs. They are unappealing and hardly safe. Examples of recent ferryboat construction include the 6,419 gross ton, 319 ft., 11,160 hp *Bluenose* for the Yarmouth-Bar Harbor run. The distance is just under 100 miles between ports in Maine and Nova Scotia. The *Bluenose* operates over a stretch of open ocean and must therefore be a ship of great sea ability with plenty of power.

By contrast the ferryboat *Evergreen State*, 310 ft. long, is driven by a pair of 1600 hp diesels. She is certified for 1200 passengers and will carry 100 autos whereas the more powerful *Bluenose* will carry 150 autos and 600 passengers. The two boats have in common convenience for the traveling public. The *Evergreen State* operates between Seattle and Winslow on Bainbridge Island, a short run on smooth water. There are 21 double-end ferries in the fleet. Many are diesel boats becoming old and due for replacement. They cross Puget Sound in several places. The big difference in design between these double-enders and the open sea Canadian vessel is that the latter is an ocean-going motor ship.

In this country ferryboats have made maritime

news for the past two or three years. The State of California has just ordered a double-end 169 ft. long, 52 ft. wide with 1000 hp. One under construction for Louisiana is 96 ft. long and 36 ft. wide, the power being 416 hp on twin screws. Two 180 by 48 ft. 1390 hp ferries have just been completed for the Manhattan-Governors' Island run on New York Harbor. A new boat has been added to the Coronado-San Diego run. These boats are built because they provide the only way for the public to travel from place to place.

Highway speed increases and ferryboat speed does not. Long Island Sound with dense population on both sides has no satisfactory method of crossing anywhere from the Whitestone Bridge to Green Point, a distance of more than 100 miles. Every effort is made to provide swift highway routes in the Great Lakes region and nothing better than we had fifty years ago is available by way of water transportation.

The bridges in the San Francisco Bay area eliminated diesel ferry boats and now the highway facilities are inadequate. Relief could be had through new concepts of ferryboat service. It seems very evident that to alleviate difficult travel conditions the waterways must be re-employed before long and this cannot be done with double-end ferryboats at a speed of 10 knots. Design modernization is up to the naval architect, of course, but let's think in terms of double or triple decks for autos, perhaps a form of sea-sled capable of high speed with no excessive surface disturbance. Are short runs the only profitable ones? Must such boats dock end on? Must they shuttle back and forth instead of turning around? Is it faster to turn around with the aid of a cycloidal propeller or a "Harbormaster" at the bow than to shuttle back and forth?

These are the kind of questions that need answering if we are to depart radically from a ferryboat pattern set over half a century ago.

Nothing in current design contemplates long fast runs under high power. Should we not think in terms of 25,000 hp ferryboats capable of speeds high enough to keep the traveler in his usual state of taut nerves. Our prediction is that we shall not

only be thinking of it, but we shall have it, and some of the manufacturers of 2500 hp diesels will then quote on sets of ten for each ferryboat.

The impact of railroad diesel requirements on the powering of boats, especially tugs and towboats is indeed great. The reason so many tugs have 1600 hp and so many more twin-screw towboats have 3200 hp is obviously the influence of locomotive powering, plus the well known factor of war surplus engines. It is an established fact that many tug boat owners who believe 1000 hp would be all they needed took the 1600 hp engine because of its price and its universal availability. Now we find the locomotive diesel moving up in power per unit and 2000 to 2500 hp is common enough, and in some instances there has been no corresponding increase in weight.

On New York harbor there was some speculation only a few years ago as to the advisability of installing 1600 hp. in railroad tugs that seemed to require only 1200 hp. Later it developed that the more powerful tugs could disregard weather and tide conditions and their work could be made to conform more closely to train schedules than ever had been true of tug operation at lower power. Having found the higher power more desirable and more functional in railroad work, the owners hastened to explain that a limit could be reached in the matter of singling up the work of two boats.

Another railroad calls for more power in some new tugs to cope with the tide condition at Hell Gate and it so happens that the newer models of high power locomotive diesel engines are "just right." They had explained previously that additional power was useless because it could not be used in two places at one time. Now it is useful because it can be applied as needed in one place at one time. Railroad practices are also being felt in the marine field outside of railroad fleets. In the days of steam locomotives, the roundhouse technique could have nothing in common with the problems of the port engineer with a lot of Scotch boilers and fore-and-aft compound engines on his hands. Now, however, the locomotive maintenance shop has more diesels to keep up than a maintenance yard for a tugboat company. Generally speak-

ing, the organization that does the most work of any one kind learns the best way to do it, and that is why maintenance techniques from the railroad shops filter down into boats powered with similar makes and types of diesels.

Over a long period of years a concerted effort has been made to have all the advantages of high torque at the engine and ideal rpm at the propeller with the perfect maneuverability of electric propulsion, without the high cost of the electrical machinery and without the sacrifice of power associated with diesel-electric drive. At first the entire job was done electrically by using a slow-speed propulsion motor, but lower initial cost and higher efficiency eventually resulted from using diesel-electric-gear propulsion.

Now, we have, in some instances, gear transmissions in large power with extremely high mechanical efficiency and excellent maneuverability. They lack the element of perfect power control inherent in electric propulsion. Reversing gears lack a complete range of sizes in one make. The combined range of all makes is broad. Since reverse and reduction gears have high mechanical efficiency, it would seem that by now every marine transmission problem should be solved by the use of available gears. However, one company has been manufacturing reverse gears, improving the design and the materials in them and bettering the mechanical arrangements for half a century. This is the Snow & Nabstdt Gear Corporation whose product is symbolized by Old Man Joe. Any time a friend of a company official enters the plant and asks about gears, the same answer is forthcoming. "We have something new about to be announced." In due course, another model is introduced and it, too, performs well. These developments have continued for 50 years and still there is more to be done with gears.

Whether gears with their higher mechanical efficiency will eventually take the place of all electric drive remains to be seen. Meanwhile the controllable pitch propeller has entered the scene without as much of a splash as might be expected. Perhaps its greatest disadvantage is its cost. Aside from power lost in transmission, electric propulsion added so substantially to the cost of a diesel propulsion system as to discourage many owners. The controllable pitch propeller also has the disadvantages of high initial cost and it is not backed by any selling influence as strong as one of the major electrical manufacturers.

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Sales Managers

G. W. Gutekunst, general sales manager of Gardner-Denver Company, has announced the appointment of William B. Knoderer as sales manager of the Industrial Division, and Niel Martin Fishback as sales manager of the Mining and Contracting Division. In 1955, Mr. Knoderer was moved to the home office of the company in Quincy, Illinois, from the Keller Tool Division at Grand Haven, Michigan. He was sales manager of Keller Tool Company before it was merged with Gardner-Denver, and had served with Keller Tool since 1947. Mr. Knoderer is a graduate of Union Col-

lege, with a B.S. in Electrical Engineering, and is well acquainted with the problems of plant and production engineers, through his work with the Keller Tool Division.

Mr. Fishback joined Gardner-Denver Company in June, 1948, and served as district manager, El Paso Branch, until his recent appointment. Mr. Fishback holds a B.S. Degree in Mining Engineering, and is a member of American Institute of Mining Engineers.

Link-Belt Bulletin

Greater load capacity and simplified application, resulting in overall economy, are two of many de-

sirable features of Link-Belt Company's self-aligning roller bearings, which are described in detail in a new eight-page book, No. 2658, just released by Link-Belt Company. This book describes Series S, adjustable single-row self-aligning roller bearings, Series D, adjustable double-row bearings, and Series M, pre-adjusted double-row self-aligning bearings. It also gives engineering selection information, complete dimensional specifications and recommended fitting practices. For detailed information about these self-aligning roller bearings which have proved their dependability on many types of heavy industrial equipment, write for Book No. 2658. Send your request to Link-Belt Company, Dept. PR, Prudential Plaza, Chicago, Illinois.

Up where the boiling point is low...



...Vernatherm® controls assure
correct operating temperature
for these BIG Diesel Machines



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Pioneered by the Detroit Controls Corporation, these Vernatherm thermostats have a reputation for solving knotty problems in the roughest kinds of service.

Call on a Detroit sales engineer for application assistance . . . or write for Bulletin 213, which gives basic data on Vernatherm Controls and their function in modern engine design.

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AUTOMOTIVE DIESEL PROGRESS

A COMMENTARY BY MERRILL C. HORINE

Merrill C. Horine, for 38 years a member of the Society of Automotive Engineers, has been actively engaged in automotive engineering, sales promotion and training, advertising and editing of automotive publications since 1907. He has contributed numerous papers on diesel and allied subjects to the SAE and other organizations. An officer in the Air Service in World War I, he was a consultant to the Chief of Ordnance and the Automotive Division of the War Production Board in World War II.

Governing Automotive Diesels

MORE complicated because its functions are more numerous, the governing equipment of a modern automotive diesel differs considerably from that of stationary, marine or railroad diesels. In addition to the basic duty of limiting the maximum speed of the engine and holding it to the desired running and idling speeds, when used in connection with road vehicles the governor must respond instantly to wire variations in desired engine speed, it must automatically compensate for differences in load at a constant speed and in some of its refined forms as it does other things as well.

These demands upon the governor arise from the fact that road vehicles are called upon to operate over widely varying terrain, including up and down grades and road surfaces varying from soft sand, mud or snow up to hard, smooth pavements.

They are required to run at frequently changing speeds in accordance with traffic, road configuration and varying speed limits. Such engines must function automatically, that is, accommodate themselves to the single, sensitive control of the foot accelerator. In the early stages of automotive diesel development it was thought unnecessary for the governor to do more than limit maximum speed, a rack stop being relied upon to set the idling speed and direct connection between the accelerator and the metering rack or its equivalent for speed control.

Several disadvantages were discovered. For one thing the maximum speed control had to act independently of the accelerator control, which introduced complications and sometimes uncertainty of results. Modern governors, therefore, incorporate a connection between their speed springs and the accelerator, so that the latter does not act directly on the metering control. At any position of the accelerator, therefore, the governor tends to maintain a constant speed, within the ability of the engine, regardless of slight changes in load. Maximum speed is limited by a stop on the speed spring whereby its maximum tension is limited.

The fixed metering stop for idling speed has also been found unsatisfactory because differences in fuel, in atmospheric conditions and the condition of the engine result in considerable variation in engine speed at a given position of the metering control. With the fixed idling stop, the cutting in or out of the air compressor and even differences in electrical load on the generator would produce fluctuations in idling speed. On some days, and with some types of fuel, the engine would idle faster than on others. As a new engine became broken in, it would tend to increase its idling speed and then, as deposits and wear accumulated, it would slow down at idle. It would idle at higher speed when warm than when cold.

Consequently, in modern governors, a separate speed spring takes over when the main spring is relaxed, and holds the idling speed constant, regardless of these influences. Connecting the accelerator with the governor speed spring has the additional advantage that the reaction upon the metering control is somewhat cushioned by the response of the governor, thus avoiding too sudden increases in fuel delivery, which tend to cause momentary smoking and knocking.

As between extreme sensitivity on the one hand and sluggish action on the other, there is a happy mean. If the governor is too responsive, that is if the speed at which it increases fuel delivery is too close to that at which it decreases it, so-called hunting occurs. This also results when the response to slight differences in governor action is too rapid or drastic, causing alternate over-run and drop in speed which causes the engine to pulsate instead of running at even speed. If the governor is sluggish, much the same effect will be produced; but usually at a slower rate of pulsation. It has, therefore, been necessary to introduce a mild damping effect in a naturally sensitive governor to achieve the "dead-beat" action which is desirable. This usually calls for careful adjustment; but once properly made, is usually relatively permanent.

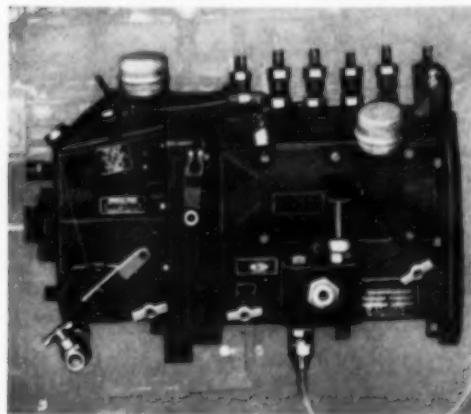
One marked difference between the response of a

diesel engine to such accelerator control and that of the direct-connected type, is that owing to the automatic compensation for minor variations in tractive resistance, the driver might be deprived of the "feel" of the load which is characteristic of those direct-connected, as in gasoline-powered vehicles. To correct this condition, some modern governors incorporate what is known as a speed droop characteristic, whereby an increase in load while the accelerator is held stationary will result in a slight decrease in speed, while upon a corresponding lightening of load, the speed will increase to a small extent. Thus the driver is an almost instinctive impulse to shift down or up as the circumstances may require.

Borrowed originally from governing systems for big diesels, the so-called torque control feature has been incorporated into some of the governors for automotive diesels. The philosophy of this feature is that for maximum torque a diesel can utilize a greater quantity of fuel per injection at low speed than it can at high speed. This, of course, is largely due to the higher volumetric efficiency of most engines at low speed as compared with high speed, thus providing more excess air when running slowly. Consequently, the governor is so designed that the maximum injection limit, such as the rack stop or its equivalent is automatically varied, instead of being fixed, in such a way that maximum fuel delivery is more restricted at high speed than at low.

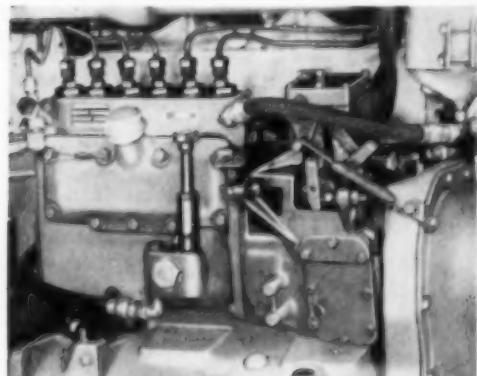
Unfortunately, experience with such torque control in the automotive field has resulted in a tendency to modify or even eliminate its action entirely. The reason for this is that, unlike large stationary, marine or railroad diesels, with their limited speed range, automotive diesels must be designed for a broad range of practicable operating speeds. Consequently their valving, including porting, valve size, lift and timing, has been designed for higher volumetric efficiency at the top speeds, raising the point of maximum air intake—roughly equivalent to peak torque and b.m.e.p., — correspondingly.

They can, therefore, tolerate less difference in maximum fuel delivery between the high and low speed extremes. Moreover, since load variations imposed on automotive diesels are greater and more frequent, there is considerably more danger of "lugging" or laboring at the lower speeds. Because of weight considerations, automotive diesels must be made much lighter per horsepower, furthermore, so that they are less able to tolerate protracted operation at low speed and high torque.



American Bosch mechanical governor built onto outboard end of multiple-unit injection pump.

Hydraulically-actuating governors generally utilize the engine's lubricating oil as the working fluid and have their own pumps by which the proper pressure is maintained for operation. It is this fact which endows these devices with the safety shut-down feature, since failure of the engine lubricating system starves the governor or oil, so that the pressure required to maintain fuel delivery fails and the control mechanism moves to shut-off position. Purely mechanical governors in some instances have been refined to the point, however, that they are able to deliver results which prove satisfactory notwithstanding the theoretical advantages of hydraulic actuation.



Woodward hydraulically-actuated governor driven directly from drive for American Bosch multiple-unit injection pump on Mack diesels.

Numerous refinements have been incorporated in modern automotive diesel governors. One of these is the means whereby all fuel delivery to the nozzles is stopped when the vehicle is drifting or coasting at speeds above idle, thus not only saving fuel wastage; but rendering the engine more effective as a retarding means, thus reducing wear on, and increasing the effectiveness of the brakes. Others include automatic injection advance control, similar to the automatic advance feature of ignition distributors of gasoline engines. These are sometimes

incorporated in the governor itself and in other arrangements, closely associated therewith.

Distributors Named by Mack

Mack Trucks, Inc., vigorously expanding its nationwide sales activities, announced today the appointments of 16 new domestic distributors. One was appointed also for Hawaii. L. E. Minkel, sales manager of Mack, said the appointments reflect growing demand throughout the country for Mack vehicles of all types as well as the company's determination to obtain a still larger proportion of the expanding truck market.

The new distributors in the United States include

Columbus Mack Truck Sales, Columbus, Ga.; Coastal Mack Sales, Inc., Savannah, Ga.; McCoy's Sales & Service, Inc., Norwalk, Ohio; Tyler Mack Sales, Tyler, Texas; Horner Mack Trucks, Inc., Vineland, N. J.; Waco Mack Sales, Waco, Texas; Lake County Mack Trucks, Painesville, Ohio; Augusta Mack Sales & Service, Augusta, Ga.; Wichita Mack Sales, Wichita Falls, Texas; Huntingdon Co., Huntingdon, Pa.; Valdosta Paint & Body Co., Valdosta, Ga.; McCormick Motors, Inc., Nappanee, Ind.; Brook Motor Sales, Inc., Mishawaka, Ind.; Nueces-Mack Company, Corpus Christi, Texas; Truck & Trailer Corp., Chattanooga, Tenn.; Greenville Mack Sales, Inc., Greenville, S. C. The new Hawaii distributor is Grace Brothers, Ltd., of Honolulu.

EATON VALVES

are Backed

by 35 Years of Diesel Engine Experience

Eaton Diesel Engine Valves are produced to meet the exacting requirements of Diesel engine service. Through more than 35 years of co-operating with the country's leading Diesel engine manufacturers, and furnishing valves to them, Eaton has developed a thorough understanding of the problems peculiar to the Diesel field. Eaton's experience is reflected in the outstanding performance records achieved by Eaton-made valves in all phases of Diesel engine service.

Eaton Diesel Valves are produced in a wide range of materials, and in both faced and unfaced designs.

Our engineers will welcome the opportunity to discuss the application of Eaton valves to your engines.

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VALVE DIVISION
MANUFACTURING COMPANY
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PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Springtites • Spring Washers • Cold Drawn Steel • Stamping • Leaf and Coil Springs • Dynamic Drives, Brakes, Dynamometers

...continued from page 55...

Eastern Diesel Observations

By Arnold B. Newell

Having known the OGP Division of the ASME and vast numbers of its members for more than 50 years, I believe it is time to pay it my respects in print as I did in person at New Orleans. To my way of thinking this organization has done more for the diesel industry than any other group of men banded together in concerted support of the diesel. From the earliest days of the diesel industry there was conspicuous lack of cohesion.

In many instances strong antagonistic tendencies killed the cooperation which is essential to the success of every industry. What should have been normal competitive selling too frequently degenerated into accretion of the detrimental instead of the helpful fractions of the business. However, the engineering profession, like the arts and sciences, is inherently free of the antipathy engendered by strong competitive merchandising efforts. Therefore the engineers have provided a common meeting ground to which men of the industry are attracted in a spirit of good fellowship and good will. When they have finished with the discussion of technical problems, enjoyed the festivities and returned to their jobs, they are in a mood to put forth joint effort to better the industry of which they are a part.

At these meetings stationary power plants and the heavy duty, slow speed engines dominate the technical papers and the discussions. No doubt this will change as time passes for the higher speed and lighter weight engines are predominant in the field and it seems to me they should be more prominently represented on the agenda. Discussions of repair and maintenance are inconspicuous. Evidently the subjects are looked upon as belonging to the realm of skilled labor which is not engineering in the true sense. Although the sales organizations are present there are no discussion of sales engineering which is on an elevated engineering and business plane. Many men will no doubt disagree when I say that sales engineering should be accorded the same recognition as other classes of engineering in meetings of this kind. After all, quite a bit of selling effort is made at the exhibits which are there for that purpose.

There are two regions that demand the special attention of the diesel industry. One is the fabulous off-shore oil drilling enterprises on the Gulf of Mexico and the other is a combination of uranium impact and natural growth of population along the coast area of British Columbia. There is, of course, a vast difference in the magnitude of the market for diesels in the two regions. A boundary line must be crossed to reach one of them which necessitates a different approach. In the Gulf area there is no substitute for diesels in drilling, pumping and servicing billions of dollars worth of equipment afloat, resting on the bottom, extending deep into the earth and towering high into the sky. As a single example of equipment try and visualize a vessel 250 ft. long, 56 ft. wide, 14 ft. draft, with a crew of 46 men. The quarters are air conditioned

throughout. Recreation facilities are provided. There are restaurants and fountain services aboard. From a flying deck planes take off for the mainland. This is a tender. It is not self propelled. It is built to A.B.S. and Coast Guard Classification and requirements. It carries two 1375 kw generators, a pair of 6-cylinder 250 kw auxiliary generators and one 60 and one 15 kw generators. All are diesel driven. The total electric power is therefore 3315 kw on what is in fact a barge towed to location to service construction of a drilling platform.

In this region there is talk of drilling 500 holes per year at a cost of about a million per hole or an expenditure of half a billion annually for the next 25 years. In the meantime similar operations are expected in the Pacific and the Atlantic coastal areas and in other countries. A tremendous need for diesels lies not alone in drilling and pumping. Vast servicing requirements call for diesel powered boats which are in some instances revolutionary. For example, a British shipyard is building some 70 ft. personnel boats with 1600 hp diesels for a speed of 35 mph carrying about 50 passengers. The magnitude of all this is difficult to grasp. It is reflected in the skyline change in New Orleans now dominated by oil company buildings and a civic belief that this grand old city is destined to become the new "Oil Capital" of the world.

British Columbia has turned out to be the leading center of diesel boat building on the Pacific Coast. For the most part the engines for the new and converted boats are imported from the United States or made under license in Canada. No great volume of European diesels have appeared for propulsion services in the new boats. Possibly because the "imaginary boundary line" has drawn no hard and fast line of demarcation between the cousin countries whereas the Atlantic Ocean is still a formidable barrier between the mother country and its Dominion. Since Britain is not the most favored source of engine supply, continental countries find themselves even less favored.

While providing a substantial market for our machinery, the Canadians may also teach us a few lessons in good marine design practices and profitable utilizations of boat types, such as packets and larger and faster ferries for long haul services. This is natural since the coastal area of B.C. is fronted by a vast archipelago growing rapidly in population where the only linkage that can ever exist is a combination of boats and airplanes. Motor vessels in this part of the country in some instances reflect the excellent practice of the British in design and construction of larger vessels. The smaller work boats are simply "Pacific-coasters," sometimes wood and sometimes steel, sometimes new and sometimes converted, sometimes big and sometimes small, sometimes modern and sometimes antique, but the total is a vast fleet of diesel boats.

From all this diverse operation comes the know-how to build boats for use in the inland waterways of the Northwest Territories where uranium ore transportation is responsible for multi-million dollar contracts for boats and barges. Once again we hear reference to "the ice break-up" and strange names, and others not so strange, are on the tongues of men—for example the rivers Athabasca and Mackenzie are identified with diesel sales

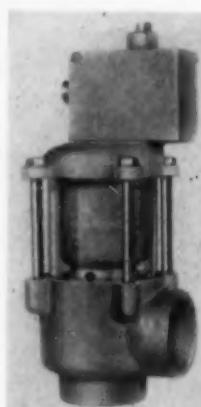
along with Victoria, Vancouver and False Creek. While nuclear power is in the process of advancing to challenge the diesel, it provides one of the fastest-growing markets for the thing it may displace.

Obviously the diesel engine, like all other kinds of machinery, requires periodic overhauling and rebuilding. Specialists in this work are as important to engines as doctors are to people. The vast difference is that medicine is a great profession—machinery repair is skilled labor. A belief has been expressed by some people that diesel repairs are a "common denominator" of general importance and interest to the entire field. That may be true, just as illness and the need of medicine are of universal importance to mankind.

With too much untutored zeal it is possible to do more harm than good by open discussion of machinery repairs. Should a prospective purchaser of an engine seeking authoritative information regarding it, first read a treatise on repair techniques, illustrated with views of damaged parts, he might be misled into believing the engine is unreliable. If an operator reads and follows the advice of an outsider instead of the engine maker's service department, costly errors may be made.

The "dynamite" underlying embryonic treatment of repair subjects is obvious to those of us having access to the maintenance manuals issued by the engine makers. They are greater in volume than all the catalogs and sales literature. Instructions for one make and model seldom apply to other engines. No periodical could find space to publish all of them. If it could be done it would result in misunderstanding of the performance characteristics of the engine which at no time should be mixed up with the performance characteristics of a crank-shaft, re-finishing lathe or a valve grinding machine.

Emergency Breakover Switch



A special fitting for installation in the water discharge line of a centrifugal oil purifier has been developed by De Laval engineers for the purpose of safeguarding against any loss of oil that might result from improper operation of the oil purifier. This float operated switch assembly permits easy observation of the normal water discharge, but is mechanically actuated by excessive volumes of water or oil. When excessive flow occurs, it opens an electrical circuit and rings an alarm in the vessel engine room. The De Laval emergency breaker switch is supplied with multiple electrical terminals in order that one or more electrical controls may be operated through it. After the cut-off switch has functioned, the circuit must be closed by means of a push button located on top of the switch before further operation can be resumed.

A considerable number of these fittings have been supplied to vessels for marine installation and U.S.C.G. approval has been granted where required.

West Coast News

By James Joseph

TO LOS ANGELES B. J. Service, six Cummins 300 hp model NRT-6-1 engines for powering portable oil well servicing rigs. Sale via Cummins Service & Sales, Los Angeles.

A LETOURNEAU Electric Wheel, powered by a Model 6DAS-844 Buda diesel has been sold to McCall, Idaho's Brown Tie and Lumber Co.

FOR LOG LOADING in the Roseburg, Oregon, area, an LS-108 powered by a Buda 6DA-779 with a Twin Disc (model CF-134-TGIL) torque converter.

FOR THE BOAT. *Remus*, El Granada, Calif., a 3 cylinder model 49B4½ Fairbanks-Morse marine diesel, rated 79 hp.

FOR COAL DECKING in the Sweet Home, Ore. area, a $2\frac{1}{2}$ yd. P&H shovel, powered with a Buda 6DAS-844 (with Western Gear torque converter). Sale to McCallie Logging Co., Sweet Home.

TEN 6DAT-779 Allis-Chalmers, Buda turbos will go into new trucks for Portland's Consolidated Freightways. Trucks have standard transmissions, no Brownies, are single axled. They'll be terminated in Portland.

CORRIGAN DISPATCH CO., Laredo, Texas, has taken delivery of a Fairbanks-Morse 33FD16, 5-cylinder, 1000 hp diesel engine. Sale announced by F.M.

To REPOWER W28 White tractors, Los Angeles' Paxton Truck Lines has purchased 14 JT-6-B, 175 hp Cummins diesel engines.

JACK KERSHAW, North Bend, Ore., owner-operator of "K" lines, has taken two 8DAMR-1125 Buda diesels to power his now abuilding 52-ft. tug boat. Engines are rigged with 3:1 marine gear. Engines are both right hand rotation. Tug will tow between Coos Bay and North Bend.

HAMILTON ENGINE SALES INC., Portland, has delivered to Lucas Brothers, Sweet Home, Ore., a model 6DA-779 Buda for repowering a model 304 Koring, for logging. Unit has a Twin Disc clutch.

LANE VENEER is repowering a model FT-40-24 Allis-Chalmers lift truck with a 4B-153 Buda.

injectors formerly manufactured by the Ohio Injector Company. Victor F. Sheronas, president of Sellers, said that in addition to manufacturing rights, the transaction includes spare parts, servicing and reconditioning facilities, all of which are now available at the Sellers plant in Philadelphia. The move is part of an overall expansion program designed to broaden the company's injector

lines and give greater customer service. In addition to injectors and auxiliary motive equipment for railroads, the Sellers Injector Corporation manufactures hydraulic cleaning equipment, acid shut-off valves and steam traps, for industrial and marine uses.

The Ohio Injector Company, one of the nation's largest manufacturers of bronze

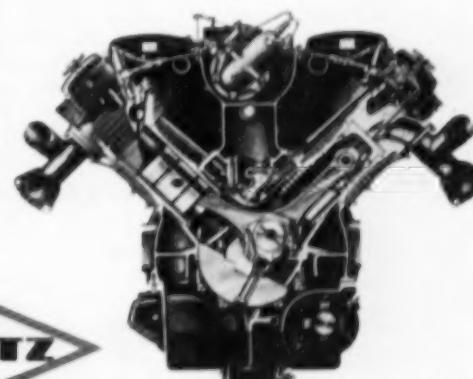
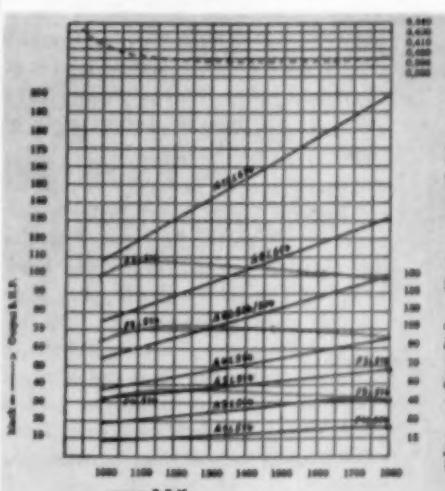
iron and steel industrial valves, will devote their efforts to development of this phase of their business.

Most of the success in engine operation is achieved in the maintenance shop. After all, no foot on the accelerator or hand on the throttle keeps a diesel pulsing. Before you tell us off, we except power plant and ship engineers.

THESE PERFORMANCES TELL THE STORY

PERFORMANCE DATA										
Type	A/FIL 614	A/FEL 614	A/F3L 614	A4L 614	A6L 614/614	A6L 614	A16L 614			
Number of Cylinders	1	2	3	4	6/8 V	8 V	12 V			
Rotation when facing Flywheel										
Combustion Principle										
Speed	R.P.M.	1000 1600 1800 1000 1600 1800 1000 1600 1800 1000 1600 1800 1000 1600 1800 1000 1600 1800								
Mean Piston Speed	m./min. m./sec.	908.4 1378 1688 908.4 1378 1688 908.4 1378 1688 908.4 1378 1688 908.4 1378 1688 908.4 1378 1688								
Continuous Rating A (10% Overload) (Heavy Duty)	B.H.P.	8.3 12.5 — 16.5 25 — 25 37.5 — 33 50 — 50 75 — 65 100 — 100 150								
Blocked Intermittent Rating B (Light Duty)	B.H.P.	— 14 16 — 28 32 — 45 48 — 55 66 — 62 100 — 119 138 — 145 200								
Mean Effective Pressure	lb./sq. in. kg./cm. ²	89 88 — 99 98 — 99 98 — 97.8 97.8 — 97 98.8 — 97.8 97.8 — 97.8 97.8								
for Tractors for Railcars	B.H.P./R.P.M. B.H.P./R.P.M.	8.3 6.0 — 6.3 8.0 — 6.3 8.0 — 6.1 8.3 — 6.18 8.18 — 6.3 8.3 — 6.3 8.3								
Min. R.P.M. on Continuous Rating	15/1600	38/1600	45/1600	60/1600	90/1600	110/1600	145/1600	220/1600		
Min. Idling R.P.M.				72/2000	90/2000	110/2000	145/2000	220/2000		
Max. Torque for AL Model	ft. lbs. mkg	R.P.M. 6.2 1300	85.8 1300	129.8 1300	178.8 1300	271.8 1300	358 1400	642 1400		
Max. Torque for FL Model	ft. lbs. mkg	R.P.M. 80.6 1300	104.6 1100	160.1 1200	—	32.9 1300	49 1400	78 1400		
Bore	in. mm.				47/8 110					
Stroke	in. mm.				87/8 140					
Swept Volume	cu. in. cu. cm.	81.18	162.32	243.48	324.6	486.9	649.3	973.8		

Thanks to its interchangeable units, the air-cooled Deutz diesel has been adapted to practically every application for which engines are used... from mobile equipment, such as tracked and wheeled tractors, excavators and locomotives, to such stationary equipment as generators, pumps and quarry power plants. Air-cooling gives the Deutz easy starting and fast warm-up, too. That's why more and more leading manufacturers are installing this engine in their products. The data recorded in the table above and on the chart below tell how the Deutz diesel can give your customers outstanding performances. And can give you outstanding sales! For further information, mail coupon below without delay. Dealer inquiries invited.



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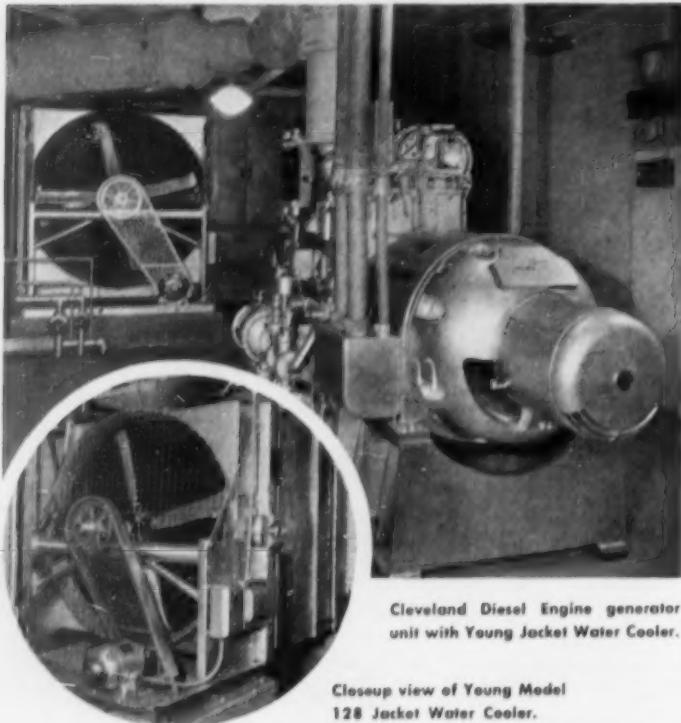
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I am interested in more details on use of the Deutz diesel for the following purposes

City: _____ **State:** _____

PLEASE SEND ME SPECIAL LEAFLETS RIGHT AWAY

Young Helps Safeguard City Telephone Service



Cleveland Diesel Engine generator unit with Young Jacket Water Cooler.

Closeup view of Young Model 128 Jacket Water Cooler.

Emergency Power Unit Cooled by Young Radiators

Take positive and dependable steps to prevent shutdown or impairment of telephone service when outside power sources are disabled or unavailable . . . this was the edict of the Wisconsin Bell Telephone Company. At Racine this challenge was met with the installation of an emergency power unit, a Cleveland Diesel Engine Division (General Motors Corporation) Model 4-268A engine. THIS ENGINE IS COOLED BY A YOUNG JACKET WATER COOLER. This radiator is used both to cool the engine jacket water and to provide suitably cooled water for use in the lube oil cooler of the engine. Another example of Young quality products entrusted with a job where absolute dependability is essential.

Get These Young Radiator Facts

Write Dept. 406-E for free catalog on Young radiators providing maximum cooling with minimum power consumption.

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Solving heat transfer problems is what we do best because it is our very reason for being. You, too, can harness the power of Young engineering talent. Write, wire or call without obligation.

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Inland River Reports

By A. D. Burroughs

CONSIDERABLE inland river excitement and anticipation has been expressed regarding the announced expansion plans of the West Kentucky Coal Company (Madisonville, Kentucky). These announced plans include the building of a \$1,000,000 load and transfer dock at Tampa, Fla., along with a planned purchase of additional new boats and barges estimated at \$5,000,000.

THE 3,400 hp boat ordered last year from Nashville Bridge Company by the Nashville Coal Company, a subsidiary of West Kentucky Coal Company, is expected to play a major role when placed on the inland rivers for this move.

FOR THE third straight year in succession, the *Stanolind A.*, owned by Standard Oil Company, (Indiana) has received recognition as the first commercial boat passing north of Davenport, Iowa, indicating the opening of the 1956 season for commercial diesel trade on the upper Mississippi River. This 16-year-old boat, built by Manitowoc Shipbuilding Company, gets her dependable power from Busch-Sulzer engines, rated at 1200 hp.

RAPIDS CITIES, the diesel tug-towboat owned by Lake Tankers Corp., New York, and built by Parker Bros., Houston, was using its 1800 hp developed from GM engines to follow the *Stanolind A.*

BLUE SEAL, powered by Cooper-Bessemer engines rated at 810 hp. at 450 rpm., was another early arrival reported in the upper Mississippi waters. Built in 1941, this craft is owned by the Illinois Farm Supply Company, Kingston Mines, Illinois.

ON THE ILLINOIS waterway, we noted the *Captain Haden* busy with cargo for the Jones Construction Company, contractors for Lock 19 there. This 18-year-old diesel hawser, owned by the W. D. Haden Co., Galveston, Texas, is powered by Atlas Imperial engine rated at 274 hp., another example of long and dependable service.

MOUNT VERNON, the popular 2160 hp. towboat, owned by Cooper-Bessemer Corporation and named for the headquarters city of her owner, has been bought by the Houston firm, J. S. Giesel and Company. This vessel, built in 1951 at Jeffersonville Boat and Machine Company was lengthened some 18 feet in 1954 at Avondale Marine ways. Three Cooper-Bessemer engines provide the power.

MISSOURI is the name selected by the officials at Federal Barge Lines, Inc., to be carried by their new powerful inland river boat planned for Missouri River service. This craft, now under construction at St. Louis Ship, will be similar in design to the renown *Lachlan Macleay*.

THE TRIPLE decker, *Miss Jessie*, is the new towboat in service on the Green River for the Green River Towing Corporation, Paducah, Ky. Built by Barbour Metal Boat Works, St. Louis, she is powered by GM (Detroit) 6-110 engines with 4½:1 reduction gears for the rated 450 hp.

OTHER construction activities at the Barbour Metal Boat Works included the single-screw craft also equipped with GM (Detroit) 6-110 engine with a 3:1 reduction gear. Measuring 41 x 15 ft., 6 inches, with a 5 foot draft, this vessel was delivered earlier in the season to the Alton, Illinois Company, Norman Brothers, Inc.

ANOTHER BARBOUR Company boat, ready for the water, with twin GM (Detroit) 6-110's, as yet unnamed, will be delivered to McDonough Construction Company, Parkersburg, W. Virginia. This one measures 53 x 16½ x 6½, and is rated at 450 hp. It carries a Fairbanks-Morse 115 volt DC generator.

THE BRAND-NEW 1800 hp. *Lady Mignon*, recently completed at St. Louis Ship for Inland Oil and Transport Company is at work in the fast-moving oil trade reporting fine performance from the two General Motors (Cleveland) Model 12-567 engines, rated at 900 hp. at 750 rpm. each. Hafco water treatment system, Burgess-Manning silencers, Wartenbe fuel filters, Goodrich 'cutless' rubber bearings in the stern struts, and Falk reverse-reduction gears are some of the familiar products seen on this new lady of the inland rivers.

MANY INLAND river folks attending the launching ceremonies of the new tug, the *Andrew J. Higgins*, the new craft powered by GM twin engines, Model 110, measuring 64½ x 20, built by Higgins, Inc., for Maximilian and Voorhies Ceramic and Ed Orgeron (Harvey, La.), have sent in enthusiastic reports. Some of these comments were regarding the remarkable operating range made possible by the 9,000 gallons fuel capacity, 26 gallons of oil, and 2,000 of water. Other comments were on the design enabling the crew to reach all parts of the vessel from engine room to pilothouse without getting on the deck!

HERCULES engines totaling 700 hp. and four Universal Boat Drives are a part of the total equipment for the new

hull being built for the Allaire Tugboat Service by Humboldt Boat Service, St. Louis. This quadruple engined boat will carry the name of *Erma A.*, named for Mrs. Ray K. Allaire.

THE *Dorothy A.*, another Allaire boat, recently completed by Dubuque Boat and Boiler Service is at work in the St. Louis harbor. It is equipped with All-

aire Universal Rudderless Boat drives, powered by Hercules engines; 350 hp.

REGARDLESS of swollen waters, along with some minor floods in the Upper Ohio area in and around Pittsburgh, river towboats were still on the job. We noted the *F. A. Botzer*, owned by Glenn M. Crain, loaded with a couple of chemical barges using the rated 215 hp. gained from the Caterpillar engine installed in 1953.

THE HOUSTON towboat, *Marilyn M.*, owned by B & M Towing Company, was seen in the Pittsburgh area with oil cargo. This craft, rebuilt and re-engined in 1949, is now rated at 1600 hp. at 720 rpm., with propulsion power provided by 10 cyl., 8½ x 10 Fairbanks Morse engines.

AN EXCELLENT photo was taken of the *Cap'n Joe*, in the Pittsburgh area. A 1954 Dravo product, powered with Atlas Model 35 engines for a total 580 hp., owner Capt. Edward Smith is enthusiastic over the fine work performance records for his boat.

A SPECIAL thank you to the reader sending in the photo of the *Bonnie Bawn*, a diesel towboat built 20 years ago at St. Louis ship. Now owned by Bihorn, Bower, & Peters, Inc., Clayton, Mo., its 165 hp. comes from a Cummins engine.

THE NORDBERG-powered *A. D. Haynes II*, was using its 4200 hp. for service in the lower Ohio waters, along with other Valley Line vessels.

THE *Raymond E. Salvati*, now under construction at Dravo for Island Creek Fuel & Transportation Company is expected to be ready for delivery in July. This twin-screw 148-foot towboat will be powered by two Enterprise engines providing 2560 hp.

Describes New Engine

With a new broadside "Two New Engines," Caterpillar describes the 310 hp D337 (Series F) Engine and the 200 hp D326 (Series F) Engine. Both the new D326 and the turbocharged D337, contain a host of Caterpillar's recent engineering and research developments. A great many possible engine arrangements are available. These are all described in the broadside. Copies of the "Two New Engines" broadside, Form No. 31914, are now available, at no charge, from local Caterpillar dealers or from Caterpillar Tractor Co., Peoria, Ill.

Retires As Chairman of the Board

The retirement of Clarence L. Ochs as chairman of the board of Eaton Manufacturing Company and the election of

Howard J. McGinn to succeed him as chairman were announced following the regular monthly meeting of directors. Mr. Ochs was immediately elected chairman of the executive committee and will continue as a director of the company. Mr. McGinn succeeded Mr. Ochs as president in March, 1951 and will continue in this office, serving as both chairman and president.

In other executive changes, Herbert S. Ide, Jr., vice president and treasurer, was elected administrative vice president and treasurer; Paul E. Minsel, manager-industrial relations, was elected vice president-industrial relations; and Raymond G. Hengst, secretary, was elected secretary and general counsel. In the latter position, Mr. Hengst succeeds Richard Inglis.

E-M "Packaged" Generator Bulletin

"ON-THE-SPOT" POWER WHEN YOU NEED IT

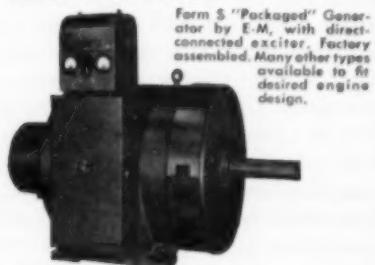


These "vest pocket" auxiliary power plants are operated by a large refining company. Such plants, comprising a diesel engine and a 100 kw E-M "Packaged" Generator, produce high-quality voltage right on the spot, for needs such as lighting, controls, communications, and even large pump motor starting and operation.

E-M "Packaged" Generators supply constant voltage automatically... dependably

Simple, trouble-free, and dependable... these E-M "packaged" units are complete. Generator, exciter, control, and all necessary components are integrated into one compact housing, ready to install and easy to connect. And no special switchboards or operating skills required!

Built-in voltage regulators assure a steady output whether generators are operated singly or in parallel. When load varies, voltage output is quickly returned to desired level.



Form S "Packaged" Generator by E-M, with direct-connected exciter. Factory assembled. Many other types available to fit desired engine design.

Sturdy E-M construction plus a minimum of moving parts gives you long service with only routine maintenance. Ratings to 187 kva, in speeds of 900 to 1800 rpm. Ask your nearest E-M sales engineer for more facts, and write for publications listed below.

ELECTRIC MACHINERY MFG. CO.
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Send for these informative brochures:
 "The A-B-C's of 'Packaged' Generators"
 E-M Synchronizer No. 35, Generator Issue
(2100-TPA-2147)

MAY 1956

NEW LUBER-FINER INDUSTRIAL MODELS ANNOUNCED



WITH UP TO 3 & 4 GALLON CRANKCASE CAPACITIES

All Luber-finer Models may be used on engines larger than recommended, however, the Pack life will be proportionately shorter.

CHECK ALL THESE EXCLUSIVE LUBER-FINER FEATURES

- **SINGLE BOLT CLOSURE**—Ingeniously designed Clamping Ring utilizes Single Bolt Closure for quick, easy Pack Replacement.
- **POSITIVE SEALING GASKET**—Long-lasting "O" ring type gasket assures leak-proof lid closure at all operating pressures.
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- **DUAL SAFETY VALVES**—Prevents oil drain-back, assuring exact crankcase oil level reading at all times, stops oil from circulating through unit if lines are reversed or if the Luber-finer Unit is otherwise improperly installed.



**AND DON'T FORGET!!
FOR LUBER-FINER'S ENGINEERED PROTECTION
—BE SURE THERE IS A GENUINE
LUBER-FINER PACK INSIDE!!**

ONLY A LUBER-FINER UNIT PLUS A GENUINE LUBER-FINER PACK CAN GIVE YOU THE EXCLUSIVE PATENTED FILTERING PROCESS THAT HAS MADE LUBER-FINER THE STANDARD OF THE INDUSTRY SINCE 1936!

Luber-finer Units are Standard and Optional Equipment on America's Leading Diesel Trucks, Tractors and Stationary Engines.

For Complete Information Write Dept. 84

LUBER-FINER, INC., 2514 S. Grand Ave., Los Angeles 7

Northeastern Diesel Notes

By A. B. Newell

AUGUST Positico of Westbury, L. I., bought a pair of new TD-24 International Harvester dozers from Ehrbar for use in general excavating.

TWENTY-FIVE diesel-electric switching locomotives have been ordered by the Seaboard Air Line Railroad from the Electro-Motive Division of General Motors at a cost of about \$4,000,000.

TWO RAILROAD tugs built for the Pennsylvania Railroad have been launched at the Staten Island Yard of

the Bethlehem Steel Company on Kill Van Kull. These are 105 ft. tugs with 1000 hp General Motors diesel-electric propulsion.

MORAN Towing & Transportation Company has ordered two 106 ft. diesel-electric tugs to be built at the Jakobson Shipyard at Oyster Bay, N. Y. Each one

will be powered by a 1750 hp General Motors diesel from the Cleveland Diesel Engine Division.

A 300 HP Caterpillar diesel, 8-cylinder, 1200 rpm engine drives the 76 ft. scallop dragger built of wood to the design of Dwight Simpson at the Bristol Yacht Building Yard at South Bristol, Maine for Love Fisheries, Inc. of Marion, Mass. The new fishing boat operates out of New Bedford.

"ON THE JOB DAY-IN AND DAY-OUT"

GM DETROIT DIESEL CASE HISTORY No. IC9-121

OWNER: The Maumee Collieries Co., Jasonville, Indiana.

INSTALLATION: GM Detroit Diesel "Twin 6-71" replaced another make Diesel in 5-yard SW Monaghan in 1948. Company now owns 24 GM Detroit Diesel-powered shovels, tractors, graders and a truck.

PERFORMANCE: Company specifies GM Detroit Diesel power "to get day-in, day-out operation with minimum attention." They report, "Our GM Detroit Diesels have given us excellent service." GM Detroit "Twin 6-71" Diesel in Monaghan has run more than 25,000 hours with only one over-haul.



THE STORY of the Maumee Collieries is duplicated thousands of times.

A customer gets his first General Motors Detroit Diesel. And it quickly establishes a fast-working, cost-cutting reputation.

Then he buys another—and another—until soon he's standardized on GM Detroit Diesel power.

For a GM Detroit Diesel is packed with real snap that makes the job go faster—sets the pace for your whole operation. And after you see what this Diesel can do, you'll be satisfied with no other Diesel.

The reasons are simple. Two-cycle operation. Easy maintenance. Simple repairs. Low-cost, interchangeable parts and fast service everywhere.

These are just a few reasons why it's *America's first choice Diesel*. Your local GM Detroit Diesel distributor can tell you the full story or write direct.

JIMMY DIESEL'S MAINTENANCE TIPS

Got Spring Fever? Maybe your engines have, too. Your GM Detroit Diesel distributor or dealer can snap 'em out of it with a spring tune-up. And he'll help you set up a preventive maintenance program to keep your engines running right all summer long. Take care of your engines and they'll take care of you and remember—Preventive Maintenance Doesn't Cost—It Pays.



DETROIT DIESEL

Engine Division
of General Motors
Detroit 28, Michigan

Single Engines . . . 30 to 800 H.P. Multiple Units . . . Up to 800 H.P.

America's Largest Builder of Diesel Engines

ANOTHER interesting contract placed by Moran Towing & Transportation Company is for a twin-screw 1800 hp towboat, 124 ft. x 30 ft. x 10 ft. 6 in., to be built by St. Louis Shipbuilding & Steel Company of St. Louis, Mo.

S. T. GRAND, Inc. of Lynbrook, Long Island has added a diesel-driven Fordson Major digger and front end loader to their general contracting equipment. The sale was made by Malvaise Tractor & Implement Co. of Garden City Park, L.I. This firm reports that they are now selling "a goodly number" of the Hercules diesel-driven Oliver Crawlers Tractors, Model DC-12 to contractors in the surrounding territory.

AS A MARKETING area for diesel-driven earthmoving equipment, Long Island is now one of the most important in the nation. There is highway and expressway work, vast concentrations of new home building, shopping centers, whole new cities in fact, and growing industry. This activity is reflected all the way down the line to sources of raw material. The gravel pits, for example, de-

mand the finest earthmoving equipment available. Stripping alone has created a good market for the most powerful bulldozers. With a break in the weather, the entire tractor market came to life with a "bang."

HENDERSON BROTHERS of Valley Stream is one of the largest contractors on Long Island. They just bought an International Harvester TD-14 with 2 1/4 cu. yd. Drott loader for use on the Long Island Expressway. Westbury branch of Ehrbar made the sale.

ANOTHER TD-14 Harvester went to Radory Construction Co. of West Hempstead from the Ehrbar, Westbury branch. Equipment is for general contracting.

THE TWO diesel-electric, 180 ft. ferry-boats built for the government at the John H. Mathis shipyard in Camden, N.J. and powered with Alco diesels of 1390 hp are awaiting completion of new ferry slips before entering service between Manhattan and Governors Island.

THE LATEST launching from the Blount yard in Warren, R.I. was the *High Island*. This is an off-shore boat for John Mecom of Houston, Texas and is powered by a pair of General Motors 6-110 diesels. She also has a GM 2-71 generating set rated 15 kw. The boat will operate out of Cameron, La.

A TWIN-SCREW towboat of 1800 hp has been ordered by Moran Towing & Transportation Co. from the St. Louis Shipbuilding & Steel Co. The dimensions are 124 ft. long, 30 ft. wide and 10 1/2 ft. depth of hull.

THE INGALLS Shipbuilding Corp. informs us that work has stopped on the 880 hp diesized cargo vessel previously mentioned in these news reports. Reason for stoppage was not disclosed.

ATTENTION should be directed to 191 barges currently under construction as reported by the American Bureau of Shipping with power, "none." Some are drill rigs, others are oil barges and there are many other types. Many of them are diesel equipped for operation of pumps, derricks and other cargo handling equipment. Propulsion wise, there is no power, otherwise many have diesels aboard.

ANOTHER MARINE market worth watching is for emergency sets on the big steamships to be built such as the Grace Line vessels.

ANOTHER Farrell Line feeder ship has been completed at the Jakobson shipyard at Oyster Bay, Long Island, for service on the West African coast. The

ship's dimensions are 145 ft. x 31 ft. x 10 ft. 9 in. Of welded steel construction, the gross tonnage is 400, deadweight cargo capacity is 219 tons and the power is 480 hp on twin screws driven by a pair of Detroit Diesel Engine Div., General Motors engines. The boat will carry a crew of eleven officers and men. It will proceed to its base under its own power.

New Appointment

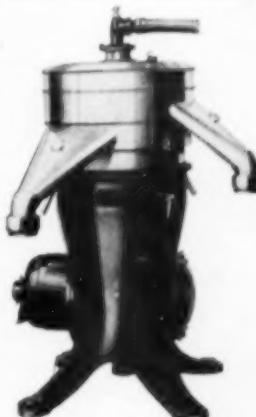
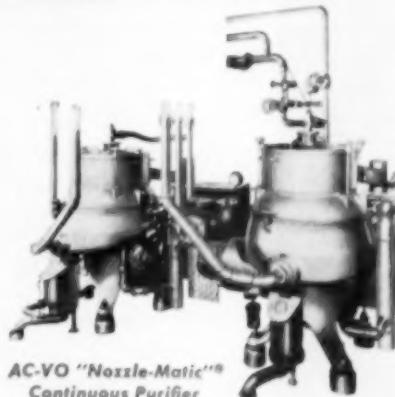
Baldwin-Lima-Hamilton Corp., Philadelphia, Pa., announces the appointment of Herbert L. Newlin as purchasing agent for the Eddystone Division. Mr. Newlin was graduated from the Wharton School, University of Pennsylvania, with a B.S. degree in economics. He

has been associated with BLH since 1936, and is a member of the National Association of Purchasing Agents.

Long before we had any of the new-fangled cold starting aids we did the trick with a squirt or two of gasoline at the inlet pipe . . . difference being that now the heads stay on the engine.

NOW...

Diesel Operation on Heavy Fuel Is Simply a Question of Which De Laval!...



There is no longer any doubt as to both the economy and the practicality of burning residual fuels in diesel engines.

And, today, there is also no question of getting the precise centrifugal purifier to prepare heavy fuel for any particular set of circumstances . . . De Laval provides three different types. Each type has proved its efficiency and freedom from trouble in many installations, both land and marine.

Recommended capacities of each type are given below. Complete details on request . . . without obligation!

RECOMMENDED CAPACITIES — G.P.H.

VIS.	TEMP.	AC-VO	PX 209. F	STANDARD PURIFIER
500	180° F	1200	600	300
700	180° F	1100	550	275
1700	180° F	660	330	165
2500	180° F	560	280	140
4000	190° F	440	220	110
5000	200° F	300	150	75



DE LAVAL
heavy fuel oil purifiers

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 9 • DE LAVAL PACIFIC CO. 901 E. Millbrae Ave., Millbrae, Calif.

A New Concept in **FULL-FLOW Filters...**

ENGINE LIFE Maxiflo

UNRESTRICTED CORE

**DESIGNED TO GIVE MAXIMUM
FLOW AND FILTRATION**

Conditions oil without restricting flow

Here's a brand new ENGINE LIFE exclusive that gives unrestricted oil flow without sacrificing strength. This new core development which required research and development of special machines and tooling right in our own plant, gives you the finest full flow oil filtering yet. Now, even the most viscous lubricating oils and fuels are filtered perfectly. Because core openings can handle up to 10 times the oil pumped through the system, the most excessive surges are easily handled, thereby protecting the hydraulic system from undue restriction and ultimate failure. All integral parts of the new Maxiflo core are of non-corrosive metal.

*With Maxiflo, as in
all Engine Life Elements,
consistency in diameter
and length is maintained*

ENGINE LIFE elements operate without impairing the hydraulics of your engine. Better oil conditioning is achieved through the ENGINE LIFE absorption method of full filtration. All ENGINE LIFE elements are engineered to meet requirements of your application.

**A COMPLETE LINE OF FILTERS
AND REPLACEMENT ELEMENTS**

ENGINE LIFE PRODUCTS CORPORATION

EL MONTE, CALIFORNIA

ENGINEERED FILTRATION SERVICE



64



ENGINEERED FOR ALL REQUIREMENTS



Lubrication system flow rates are maintained by the free area ratio of perforation. Openings equal up to 10 times amount of oil volume pumped through engine.



Non-corrosive Metal Cores are end sealed with metal rings to insure trueness, add lip strength.

Gulf Coast Diesel News

By Michael T. Pate

STATION CONSTRUCTION Company, Houston, has bought from the Houston branch of Allis-Chalmers Company a model BDA8 7½ kw generating unit for auxiliary power on a pile-driving barge. The generator is driven by an A-C diesel.

ROBERT H. RAY COMPANY, Houston, has bought an additional two model 2GD21C Stewart & Stevenson ac generator sets for export service. These units are each enclosed in a sheet metal housing and mounted on a 2-wheel rubber-tired trailer. Power is furnished by GM series 71, model 2030C diesels.

T & P PUMP & SUPPLY Company, Hobbs, New Mexico, has bought from Waukesha Sales & Service, Inc., Houston, a 33-hp model 180DLCU diesel which is destined for underground haulage in the potash mines there.

GULF OIL COMPANY, Houston, has taken delivery of a model DA275 Allis-Chalmers diesel from the Houston branch of Allis-Chalmers. The diesel is rated at 40 hp, continuous.

EMSCO MANUFACTURING Company, division of Continental Supply Company, has taken delivery of three model 6WAKDBU Waukesha diesels, rated at 210 hp each, at 1600 rpm. The diesels will be used to power an oilfield drilling rig.

PLATZER BOAT WORKS, Houston, has taken delivery for the account of the Standard Oil Company of Texas of two series 110, model 122203 tandem 6-cylinder GM diesels, rated at 440 hp. each. They will be used to power the oil company's new 90-foot steel crew boat for offshore service. The company also purchased two Stewart & Stevenson model 2MD20 ac generating sets, powered by series 71, model 2061A GM diesels.

GARDNER-DENVER Company, Dallas, Texas, has bought from Waukesha Sales & Service, Inc., Houston, two model 148DKU Waukesha diesels, rated 150 hp at 1400 rpm., which will be used for mud-pump drives.

AUTOMATIC POWER, Houston, has taken delivery of an additional ten model BD77 15 hp and four model BD153 30 hp Allis-Chalmers diesels which will be used as power in seven sets of warning signal units for offshore oil platforms. The units were delivered by the Houston branch of Allis-Chalmers.

DUVAL MINES Company, Hobbs, New

Mexico, has purchased from Waukesha Sales & Service, Inc., Houston, a model 190DLC 60 hp Waukesha diesel which will be used in the company's underground haulage system in its potash mines near Hobbs.

MID-CONTINENT Supply Company, Fort Worth, Texas, has bought from the diesel division, Fairbanks, Morse, two model 45C4½ diesels, rated at 10½ hp.

GULF PIPE LINE COMPANY, Houston, has bought from Allis-Chalmers Company and through the Oil & Gas Supply Company, Houston, a model DT468 Allis-Chalmers diesel rated at 60 hp. The engine will drive a pump on crude oil gathering for the company.

TIDELANDS Manufacturing Company, Houston, has bought from Waukesha Sales & Service, Inc., of Houston, two model 180DLCU Waukesha diesels, rated 33 hp. at 2000 rpm.

OILWELL SUPPLY Company, Houston, has bought from Stewart & Stevenson Services, Inc., Houston, a series 71, model 2031-C General Motors diesel, which will drive a centrifugal pump.

INTERNATIONAL Minerals Company, Hobbs, New Mexico, has bought from Waukesha Sales & Service, Inc., Houston, two model 180DLC 35-hp. Waukesha diesels which will be used to repower two of the company's "Jeeps" in underground mine hauling.

CONSTRUCTION & MAINTENANCE Company, Houston, has bought from Stewart & Stevenson Services, Inc., two series 110, model 62203 6-cylinder marine diesels, with 2.75:1 hydraulic reduction and reversing gear. The two 220-hp diesels will power the company's new crewboat, the *Offshore*.

FOSTER CATHEAD Company, Wichita Falls, Texas, has bought from Waukesha Sales & Services, Inc., Houston, four model 180DLC Waukesha diesels, rated at 35 hp which will be used by the company to power shot-hole rigs.

VINCENT SHELL Company, Bridge City, Texas, has bought from the Houston branch of Allis-Chalmers Company a model DT468 A-C diesel which will be used to repower a Koehring dragline. The diesel is rated at 60 hp continuous.

BROWN & ROOT, INC., Houston, has bought from Big 3 Welding Equipment Company, Inc., Houston, 31 Lincoln welding generators of 300 amp. capacity, each powered by a series 71, model 2055 GM 2-cylinder diesel. The company also bought seven 250 amp. capacity Lincoln generators, each powered by a 4-cyl. model DIX4D Hercules diesel.

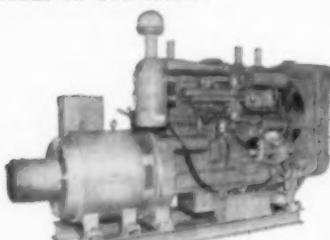
Solenoid Valves Catalog

A new, comprehensive catalog from Atkomatic Valve Co., Inc. (Indianapolis, Indiana) describes the company's complete line of electrically operated two-way solenoid valves for air, gas, steam and liquid flow control. Free on request, the catalog lists available dimensions, specifications, pressures and applications.

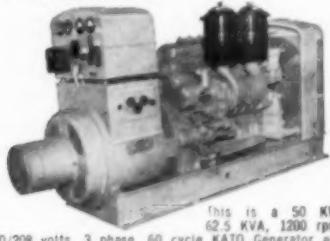
KATO

Continuous A.C. Standby Power
GENERATORS

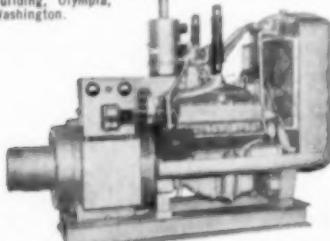
... a size and type to meet your needs to 500 KVA.



Above photo shows a 50 KW, 62.5 KVA, 1200 rpm, 3 phase, 60 cycle KATO Generator and instrument panel, driven by an International Model UD-18A diesel engine. Installed for the Mechanical Construction Division in Salt Lick, Kentucky.



This is a 50 KW, 62.5 KVA, 1200 rpm, 3 phase, 60 cycle KATO Generator and instrument panel, driven by a General Motors 6030C diesel engine. Installed in the State Office Building, Olympia, Washington.



This picture shows a 75 KW, 93.5 KVA, 1800 rpm, 240 volts, 3 phase, 60 cycle KATO Generator and instrument panel, driven by an H-540 LeRoi engine utilizing natural gas for fuel. For Republic Steel Corporation of Gary, Ind.



An illustration of KATO's versatility. A 350 watt KATO Generator driven by a Leuson LMH engine and a 150 KW, 187.5 KVA, 750 rpm, 120/208 volts, 3 phase, 25 cycle KATO Generator and instrument panel, driven by a General Motors twin 6-71 diesel engine. For Duluth, Mesabi & Iron Range Railway.

Your inquiries invited.

KATO Engineering Company

1443 First Avenue, Mankato, Minnesota

cations of solenoid valves in bronze and stainless steel. All Atkomatic valves are custom built and individually tested for a diversity of industrial uses. The illustrated catalog also contains numerous coil and flow charts and other useful information.

To obtain this engineering guide, write for Catalog 200, Atkomatic Valve Co., Inc., 545 W. Abbott Street, Indianapolis, Indiana.

Vane-Type Flowmeter

An efficient, simply designed vane-type flowmeter for air or gas flow, No. 1050, is now being offered by the Instrument Division of Scully-Jones and Company, Chicago manufacturer of precision holding tools. This flowmeter is designed for a constant pressure drop across the meter and may be used for indicating, controlling, signal alarm, safety shutdown, sequence starting or shutdown, and similar applications.

Operation of the instrument is extremely simple. As the vane rotates with increase in flow, the area between the end of the vane and the flexible spline in the meter body increases. This increase approximates the law of squares to provide pointer stability and an easy-to-read scale. By varying the weight of the vane, and the area, various capacities can be produced. The area is shaped to provide an evenly divided scale. Pointer movement on the dial is multiplied by gearing to produce a dial that is easily read at a distance. Simple adjustments are provided to easily and quickly correct calibration for densities of different gases.

For complete information, write to Scully-Jones and Company, 1901 South Rockwell St., Chicago 8, Ill.

Named Manager

Dean K. Steidinger has been named manager of the Jackson, Michigan, district of Allis-Chalmers Industries Group, according to an announcement by V. L. Spinney, manager of the company's central region. Mr. Steidinger succeeds Lathrop F. Berry, who has been at Jackson since 1927 and who continues as a special representative there. Mr. Berry has been associated with Allis-Chalmers since 1922 and was a sales representative in the firm's Detroit office for two years before being transferred to Jackson.

Mr. Steidinger had been assistant manager in charge of sales at Washington, D. C. He came with Allis-Chalmers in 1940 after receiving his electrical engineering degree from Oregon State Col-

lege. He was an application engineer in Allis-Chalmers switchgear department before being assigned to the Washington district in 1948.

Assistant Chief Engineer

G. H. Yelinek, chief engineer of Deluxe Products Corporation, LaPorte, Indiana, has announced the appointment of Jos-

eph R. Anderson to the position of assistant chief engineer. Mr. Anderson has been with the LaPorte company for 20 years, serving in various filter production and engineering functions. His new responsibilities will include engineering co-ordination with sales and assisting Deluxe filter and cartridge users with field installations, service tests and special filter applications.

* AMERICAN GEAR'S new PGT is a hydraulically operated, compound planetary transmission that provides a simple, versatile and extremely flexible means of power transmission.

* PGT's outstanding performance has been verified by complete tests in the laboratories of one of the country's leading Institutes of Technology.* It has been successfully used on earth movers, tractors, road rollers and similar equipment. Sturdily built, conservatively rated, PGT offers important advantages over more complex transmissions, including:

- Easily operated by anyone by merely moving a single hydraulic control lever
- Practically instantaneous (1.5 seconds) change of speed or direction without shifting gears
- Only one control valve lever for all speeds and neutral
- Utterly smooth...no shock...no jerk...no noise
- Cushion shift prevents shock loading, eliminates trouble
- Two power take-off apertures can transmit up to one-third of engine output maximum
- Eliminates operator fatigue by eliminating clutch pedal
- Hydraulic control lever placed convenient to operator without regard to location of transmission
- Planetary gearing means considerably less length for comparable loads and speeds
- Positive pressure-fed lubrication to bearings and gears

* Complete report on request

Write today for this new 8-page booklet which gives complete information, design details on all 7 models of PGT transmissions

* 7 DIFFERENT MODELS * 85 OR 150 TO 300 LB. FT. TORQUE
1 OR 2 SPEEDS FORWARD * CHOICE OF REVERSE RATIOS

USE PGT TRANSMISSION ON

- Lift trucks • Earth movers • Hoists and cranes • Car pullers • Slushers
- Conveyors • Power take-offs • Front end loaders • Road rollers
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EMD Expansion

Manufacturing space of Electro-Motive Division of General Motors at its No. 1 plant in McCook, Illinois, will be increased 42 per cent, to be in operation early in 1957, it was announced by N. C. Dezendorf, general manager of Electro-Motive and vice president of General Motors. Growth of the division's diesel

locomotive manufacturing and rebuild business and an increasing rate of acceptance of two new products in the electric utility and oil well drilling fields make the expansion of facilities necessary, Mr. Dezendorf pointed out.

Two thousand new jobs for Chicagoland workmen in many skilled classifications will be created by the expansion. Mr.

Dezendorf said. Hiring will start as rapidly as any part of the new facilities is ready for operation. Some operations will be ready late this fall. The division now employs over 9000 persons at the No. 1 LaGrange plant, 2500 at Plant No. 2 at 103rd Street and Cottage Grove Avenue in Chicago, and over 500 in rebuilt plants at Halethorpe, Md., Jacksonville, Fla., Robertson, Mo., Every-

ville, Cal., Los Angeles, Cal., and North Salt Lake, Utah; in regional offices in New York, St. Louis, Chicago and San Francisco, and in parts warehouses in Minneapolis, Minn., and Fort Worth, Texas.

The various additions to the manufacturing facilities will provide over 805,000 square feet of new floor space. "Two factors of interest to the public contribute to the increase in the diesel locomotive business," said Mr. Dezendorf. "More than a year ago, the Class I railroads of the United States gave evidence that they were going to complete dieselization as quickly and economically as possible, and stepped up their buying rates accordingly. On top of this came an increase in railroad business due to growth of the national economy. Some idea of the effect of this on our business may be gained from the fact that six major railroads that had publicly announced in 1954 they were completely dieselized came back to us in 1955 and ordered more Diesel locomotives. In addition, our locomotive rebuild business continues to mount substantially each year and the export market has grown until this year it demands the equivalent of almost one locomotive unit a day."

"Meanwhile, the two new major products we announced in 1955 have begun to take hold in their markets. Electric utilities in both the domestic and export markets have placed orders for the Electro-Mobile Power Cars (mobile generating units) in such strength, and are showing such interest in future applications, that we are taxed to meet the demand with the present facilities. The same situation faces us with respect to our new heavy-duty Diesel-electric power plant for deep oil well drilling rigs."

Pritchard Representative

The Ernest L. Graves Company, of Tulsa, has been appointed sales representative in the state of Oklahoma by J. F. Pritchard and Co. of California, Kansas City, Missouri. Pritchard designs and manufactures cooling towers for air conditioning and industrial applications and Hydryers, packaged dehydration units for the drying of air and other gases.

Ernest L. Graves' experience includes four and one-half years as mechanical engineer for Shell Pipe Line Corporation; one year as section head engineer for Standard Oil Company of Indiana, Products Pipe Line Department, and seven years sales experience, the last two of which were spent as sales manager, for a manufacturer's representative in Tulsa, Oklahoma.

**HIGH POWER
LOW WEIGHT
SMALL SIZE
LOW FIRE RISK
EASY MAINTENANCE
RELIABILITY
LOW FUEL CONSUMPTION**

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The British Navy chose DELTIC for their latest 'Dark' Class high-speed patrol boats—and here's what they say about it: 'The best power/weight ratio ever achieved in a marine diesel'. The DELTIC is in full production and available for the U.S. market now. In craft of all kinds and sizes—naval patrol boats, revenue cutters, communications launches for off-shore oil drilling, freighters and tankers—the DELTIC will give compact, reliable power at low cost. And the DELTIC 'overhaul-by-replacement' service—operating in every major port—will cut lay-up time from weeks to hours. Sounds as if you should choose DELTIC! Then get in touch now with Napier's U.S. representative.

(825-2500 b.h.p.)



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Write, wire, call now: L. O. Brooks, Suite 625A, Dupont Circle Building, 1346, Connecticut Avenue, N.W. Washington 6, D.C. NOrth 7,0146.

CRC 013

New Distribution Policy

A new distribution policy for material handling equipment, products of its Buda Division, is announced by Allis-Chalmers Mfg. Company, Milwaukee, Wis. Now, for the first time dealers for this equipment will work through twelve factory branches and a Chicago district office in serving the United States and Canada. The branches will supervise sales and service and will carry a stock of parts, as well as new machines and accessories.

This new policy will mean a closer contact for dealers and customers with the company in the field. This also makes available the facilities of the company's factory branch operations to the particular sales area. Dealers will continue to stock machinery and parts for full sales and service of Allis-Chalmers fork lift trucks, platform trucks and industrial towing tractors. Factory branches will have material handling sales managers and factory-trained service managers to work with dealers.

Allis-Chalmers branches designated include Atlanta, Ga.; Harrisburg, Pa.; Syracuse, N. Y.; Columbus, Ohio; Memphis, Tenn.; Minneapolis, Minn.; Kansas City, Mo.; Dallas, Texas; Los Angeles and Oakland, Calif.; Portland, Ore.; Toronto, Ont., Canada; and the Chicago office.

Technical Paper

W. H. & L. D. Betz, Philadelphia, Pa., Consultants on Industrial Water Problems, announces the publication of Technical Paper No. 133, "Determination of Carbon Dioxide in Water by Conductivity Measurements." This technical paper describes a new method developed for the determination of carbon dioxide which is applicable to analysis of water-side deposits, treatment chemicals and organic carbon in water. The principle of differential conductivity permits rapid, accurate analyses.

Copies of Technical Paper No. 133 may be obtained by writing to W. H. & L. D. Betz, Gillingham and Worth Streets, Philadelphia 24, Pa.

Oakite Booklet

Removal of rust and lime scale by simple soaking or circulating is the subject of a new folder recently published by Oakite Products, Inc., manufacturers of industrial cleaning and related compounds. The booklet describes the action of Oakite Compound No. 32, an inhibited liquid descalant, which is said to eliminate mechanical scraping or rodding out. Specific instructions for simple application procedures are given, as well as di-

rections for control of the solution strength. Copies of the folder are available from Oakite Products, Inc., Rector Street, New York 6, N. Y.

Mexican Purchase

Molinas Azteca, Cerralvo, Nuevo Leon, Mexico, has taken delivery on two of an order for four model PC2505 Allis-

Chalmers diesels, each connected to a 250 kw, 60 cycle ac generator and equipped with Massey governors. These diesels will power the company's corn-grinding plant, with a capacity of 100 tons per day, and also furnish current for city power. The generators are from Houston Armature Works, Houston. The diesels were bought through the Houston branch of A.C.

When a rash of trouble breaks out in your fleet of diesels, that is pretty conclusive evidence that the "lemons" in your setup are of the walking-talking kind bearing no relation to intricate patterns of iron and steel. This, of course, applies only to the other fellow.

... NOW with **morco** Factory-Certified Exchange Crankshafts You Can Count on Trouble-Free Operation for the Full Life Cycle of Your Engine

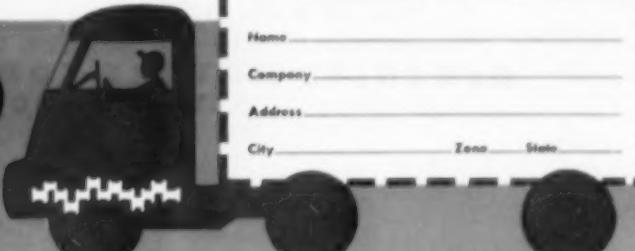


morco's factory methods turn out like-new crankshafts reconditioned to standard undersizes at a fraction of the cost of a new crankshaft. MORCO dealers—coast to coast—are stocked with a supply of reconditioned shafts for different diesel engine models. Users of Detroit Diesel and Cummins engines can exchange worn shafts for MORCO reconditioned shafts through authorized dealers. You get immediate service, guaranteed quality and terrific economy.

Why take chances? There is no substitute for factory parts and methods. Let your Engine dealer be your source for dependable, safe crankshaft regrounding. Let him help you get the most out of your operating dollar with MORCO Exchange Crankshafts.

*TOCCO is a registered trademark of The Ohio Crankshaft Co.

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General Manager



E. J. Mercer has been appointed general manager, Construction Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee, according to B. S. Oberlink, vice president in charge of the Tractor Group. Mr. Mercer has been managing director of Allis-Chalmers Great Britain Limited with headquarters at Essendine, England. In that position he directed all operations for world sales of English A-C products.

Cummins Expansion Program



On announcing a \$6,000,000 capital program for 1956, officials of Cummins Engine Company, Inc., Columbus, Indiana, also revealed a master plan for continued improvement and expansion of production facilities. Shown with a model of the "plant of the future" are, left to right: C. R. Boll, vice president, Sales; R. E. Huthsteiner, president; and E. D. Tull, executive vice president.

Industrial Sales Representative



Mr. Stephen Johnson, of Houston, Texas, has been appointed industrial sales representative for The Briggs Filtration Company of Washington, D.C., manufacturers of filtration equipment for over a quarter of a century. He will be serving the Houston area with his offices located at The Briggs Filtration Company, Room 366, M & M Building, Houston, Texas, Telephone: Capitol 8-4427. Mr. Johnson has been associated with the diesel engine field—marine, stationary and automotive—for the past nine years.

Delivers Two Yachts

In keeping with the modern trend to the use of bigger and finer motor yachts, the John Trumper & Sons, Inc. yard at Annapolis, Maryland, has delivered two beauties in the 65-70 ft. range of sizes. One of these is the 67 ft. *Silver Mist* for Herbert Stone of York, Pa. and the other is the *Rumak III* for Mr. and Mrs. William M. McKelvey of Pittsburgh. Both are twin screw with G-M 6-71 diesel propulsion.

HERCULES ENGINES...

The complete line of engines and power units from 3 to 500 H.P.

OVERHEAD VALVE GASOLINE ENGINE CLOSED TYPE POWER UNIT TURBULENCE CHAMBER DIESEL ENGINE

BASE TYPE POWER UNIT "PANCAKE" or HORIZONTAL ENGINE

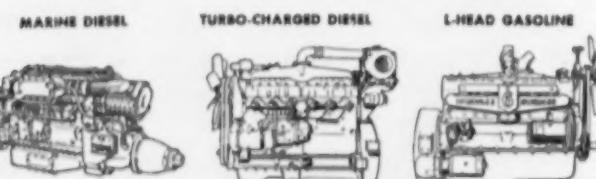
NATURAL GAS L-HEAD ENGINE DIRECT INJECTION DIESEL ENGINE

The wide selection of engine types and sizes in the Hercules line, plus the flexibility of our production facilities provide a complete line of dependable power to meet the varied needs of many different industries.

In addition to the various types of engines and power units illustrated,

it is the policy of Hercules Motors Corporation to engineer and produce these engines to the specific requirements of each industry.

For assistance in solving your particular power problems, contact Hercules Motors Corporation—Engine Manufacturing Specialists since 1915.



HERCULES MOTORS CORPORATION
CANTON 2, OHIO

GM District Manager



C. A. Mapp

V. H. Peterson, vice-president—Railroad Sales, Fairbanks, Morse & Co., Chicago manufacturers, has announced the appointment of Charles A. Mapp to the position of district manager, Railroad Division, with headquarters in Chicago. Mr. Mapp will have responsibility for the sale of all company products to the railroads, including locomotives, in the Middle West, including the Twin City area. He will also be responsible in the St. Louis and Southwest areas for locomotive sales only.

"Chuck" Mapp, as he is known to his many friends and business associates, was graduated from Duke University in 1943. He joined Fairbanks, Morse & Co. in January of 1947 and gained his initial experience in the Locomotive Service Department. Following this, he devoted some time in Locomotive Sales in the Chicago area and did similar work for several years in Locomotive Sales in the East. For the past year and one-half he was on a tour of duty in South America and returned to the United States only recently to accept his new appointment.

New Micronic, Full Flow Filters



Newly engineered filter housings, Series QS, have been announced by The Cuno Engineering Corporation. These housings have been designed specifically for high capacity diesel full flow lube systems. Features of this new design are easy maintenance, effective micronic filtration, high flow rates and lower cartridge replacement cost. The quick opening cover design has been redesigned for fast and easy cartridge changes. One man can simply drop the swing bolts, lift the cover arm, swing the cover aside and remove the cartridges in a matter of minutes.

The cartridges used in these new housing are the Cuno Micro-Klean replaceable type. Degrees of filtration using these cartridges are 5, 10, 25, or 50 microns. Flow capacities for single housings are high.

The manufacturer recommends for greatest economy and effective filtration that the "QS Series" filter be preceded by the new Cuno Super Auto-Klean on full flow applications.

ITS NEW

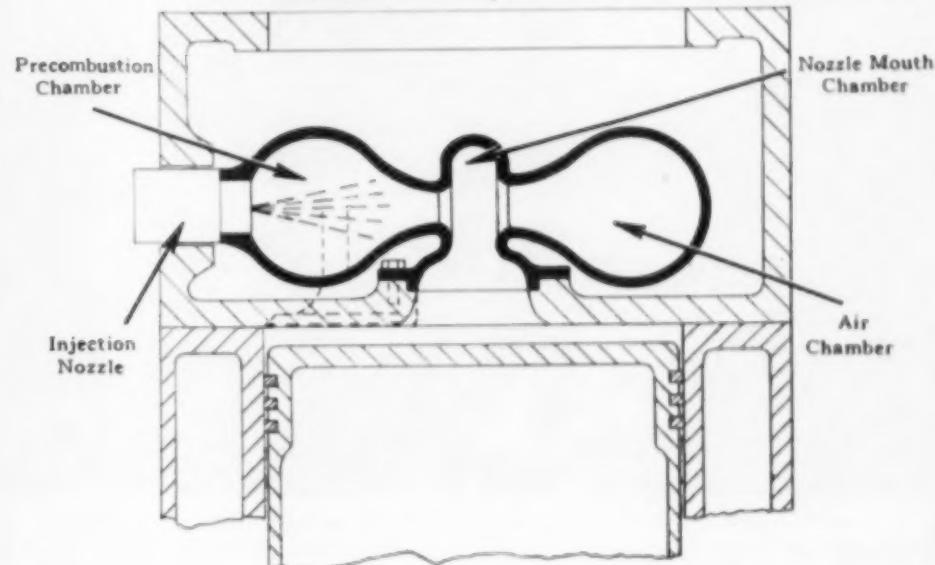
Correction, Please



James G. Tuthill

In the April issue of DIESEL PROGRESS, we erroneously captioned a photograph of James B. Tuthill. We are herewith reprinting the photograph, correctly captioned. Mr. Tuthill has recently taken over the presidency of Tuthill Pump Company, leading equipment maker.

50% INCREASE IN POWER CAPACITY OF DIESEL ENGINES IS POSSIBLE WITH SCHNEIDER JET COMBUSTION



Burning fluid "torches" do not impinge upon moving operating parts. Peak pressures and temperatures are confined to the combustion chambers. The engine operates without knocks and smoke. Write for article in "Diesel Progress," December 1955, page 44. We grant licenses to manufacturers.

SCHNEIDER BROS. CO., Box 7, Kittredge, Col., USA

WRITE FOR REPORT that shows how to minimize injector tip erosion—remove 99.95% water and 99.0% abrasives from diesel fuel oil



THE COAST GUARD DID IT ON THEIR NEW

95' DIESEL PATROL BOATS

Water, water-oil emulsions and abrasives are a definite . . . and preventable problem on sea-going vessels. Here's a new and enlightening report on how to remove water and abrasives without materially affecting flow of fuel. This new report is full of data that will give you some amazing answers. Write for it today.

THE NEW BRIGGS WSF-7.5
ALL ALUMINUM FILTER/SEPARATOR

WRITE FOR THIS IMPORTANT REPORT



FUEL FILTER/SEPARATOR

OIL FILTERS FOR OVER
A QUARTER OF A CENTURY

DEPT. 101
THE BRIGGS FILTRATION CO.
WASHINGTON 16, D. C.



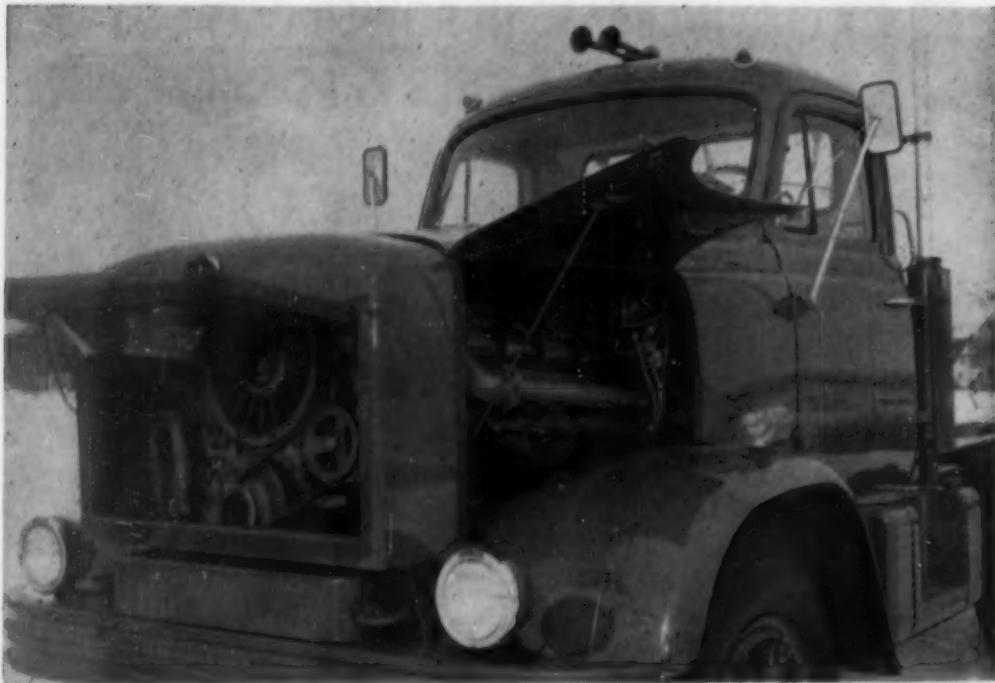
YES! Send me the above report. No Cost.

Name _____

Company _____

Address _____

New FWD Truck



A new four-wheel-drive tractor featuring an air-cooled Deutz F8L614 diesel engine, asserted to provide high fuel and oil economy and simplified maintenance, will be introduced soon by Four Wheel Drive Auto Company of Clintonville, Wis. Designed as a 6 x 4 with FWD's exclusive power-proportioning, fully-compensating center differential, the new Four Wheel Drive tractor, Model

T-6414D, will have front axle weight of 6,722 pounds and rear axle weight of 5,905 pounds.

Use of the Deutz air-cooled diesel engine in an FWD tractor is expected to combine great operating economies with the greater payload and safety advantages of four wheel drive. The Deutz engine boasts excellent mileage characteristics and is low

on lubricating oil consumption. FWD's patented center differential, distributing power to front and rear driving wheels in proportion to load, provides up to 37 per cent greater tire economy by eliminating the excessive tire wear normally resulting on turns. In addition, utilization of driving front and rear axles permits better load distribution and hence greater payloads. Conversion of all weight to usable traction by means of four wheel drive assures greater driving control and safety under all road conditions.

The air-cooled Deutz diesel powerplant is an eight-cylinder V-type engine made by Klockner-Humboldt-Deutz Manufacturing Company of Cologne, Germany, one of the oldest engine producers of the world. The engine has a net horsepower rating of 170 at 2,300 rpm., including running of all accessories. Its maximum torque is 447 lbs. ft. at 1,200 rpm. Engine bore is $\frac{3}{8}$ inches, stroke $5\frac{1}{2}$ inches, piston displacement 649.2 cubic inches, and compression ratio 17.8 to 1. The engine utilizes indirect fuel injection with swirl chamber. Because of the engine's design, FWD has coupled it with a five-speed transmission. Maintenance costs of the Deutz engine are low because of the use of individual, readily-removable heads and cylinders.

The FWD Model T-6414D with Deutz engine will be the fourth transport tractor introduced by Four Wheel Drive within a year. The newest FWD tractor will be 101 $\frac{1}{4}$ inches front bumper to back of cab.

(ITS NEW)

met the
PETTER DIESEL
family yet?

In the rugged PETTER diesel family are air-cooled and water-cooled models all the way from 1½ hp (the toughest baby yet) to 48 hp. And long, faithful service is an old Petter family tradition; witness the more than 400,000 Petters in use throughout the world.

The Petter motto is "ubique" (we get around). You'll find Petters driving well pumps in the Persian Gulf, irrigation systems in India, marine auxiliaries in Louisiana, standby generators in Connecticut. There isn't a piece of powered equipment in its range for which a Petter can't do a better, dieselize job . . . cut running costs and fire risk.

For rugged power in junior sizes, check the Petter range today! Write for information—a few choice dealerships are still open.

PETTER DIESEL ENGINES



Division of BRUSH ABOE INC.
60-07 39th Ave., Woodside, L.I., N.Y.
Branch office: 3307 Stillman St., Jacksonville 7, Fla.

DIESEL ENGINE CATALOG

The purpose of this little advertisement is to tell you about Volume 20 of DIESEL ENGINE CATALOG which is now available, entirely revised and rewritten. This is the 20th edition of the book that has earned the name of "the bible of the industry."

All smart diesel engine salesmen carry this book around in their car. When they run into some new competition with which they are not too familiar, the DIESEL ENGINE CATALOG gives them full, accurate information when they need it most.

The consulting engineer keeps this book in his reference file. It immediately gives him all data on diesel engines coming within a given horsepower range, speed range and weight range.

People who sell, people who buy, people who use diesel engines need this new, fully illustrated, up-to-the-minute volume. It has been completely revised and expanded. Orders are now being accepted for this latest edition. Price \$10.00 prepaid.

Add California Sales Tax for Delivery in That State

DIESEL PROGRESS
COLE STATION
LOS ANGELES 46, CALIFORNIA

Eastern Office Burns

The building that housed our Eastern Headquarters in Rockville Centre was burned to the ground last weekend. All our records were lost and it will take two to three weeks to get reorganized. In the meantime, emergency contacts with Robert K. McQuiston can be made at his home, 304 Broadway, Massapequa Park, Long Island, phone Pyramid 9-7714. Arnold B. Newell also can be reached at his home, R. F. D. 2, Yorktown Heights, New York, phone Birchwood 8-7038. In our next issue we hope to carry the new address and phone number of our Eastern Headquarters.

DIESEL PROGRESS

Twin Screw Yacht

One of the attractive 42 ft. twin-screw General Motors 6-71 diesel driven Convertible Sedans was recently shipped by the Matthews Company of Port Clinton, Ohio, to the Donovan Boat Supply Company of New Orleans. With fold-away doors between cabin and cockpit to give 20 feet of open area, the boat sleeps six, has two toilets, electric heat and range, automatic pilot and ship-to-shore phone for owners needing these items because of long cruises.

New 60 Cycle Rotor Design

Something new in rotor design is an eight-pole unit for a 60 cycle, 220/440 volt, delta connected three-phase generator. The generator will have a 10 kw rating at 900 rpm. The rotor is believed to be the first 8-pole machine to be used with monocoil. The new type rotor was developed by Kato Engineering Co., Mankato, Minnesota. The rotor castings encompass the field coil. The complete armature is coated with highest grade varnish that will not crack, making one homogeneous mass. The 10 kw machine at 900 rpm is made to assure extra long engine life. The diesel that will power the unit can be operated at very slow speed.

To Power Texas Fishing Boat

Muchowitz Fish Company, of Freeport, Texas, has bought from Stewart & Stevenson Services, Inc., Houston, two series 110, model 62203 6-cylinder GM diesels, rated 220 hp., each equipped with hydraulic reversing and reduction gear with 3:1 ratio. These engines will power the company's new fishing boat the *Big M*. They also bought another diesel of similar rating which will be used to convert the *Miss Freeport* to a

twin-screw craft after the hull has been lengthened 30 feet. Each of the craft will be equipped with a Stewart & Stevenson model 3MD30 marine ac generating set, driven by General Motors series 71, model 3061-A diesels.

Constructs New Building

General Controls Co. announces the

construction of a new building in San Francisco that will increase San Francisco facilities by 120 per cent. Of modern, functional design, the new showroom and warehouse encompasses 4400 square feet, with office quarters located on a level above the auto driveway. Test facilities will be provided, and service schools and sales meetings will be accommodated in rooms with accordion

type walls that can be adjusted to the size of each group.

Manufacturing plants are maintained in Glendale and Burbank, in California; in Skokie, Illinois, Iron Mountain, Michigan, and Guelph, Canada. Forty-two factory branch offices extend over the United States and Canada; seven regional warehouses help carry the stock.

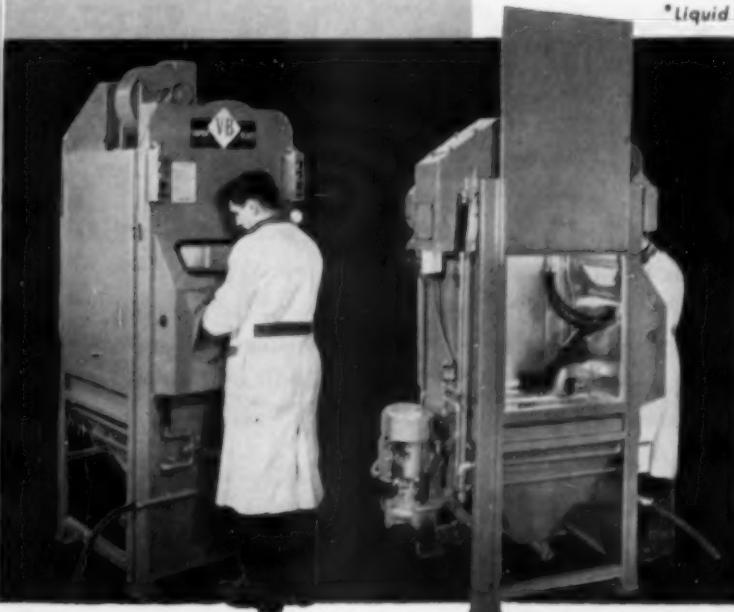
With
V-B Liquid Honing*
One Man Does Work of 8



Whatever your production problems — engine overhaul or surface conditioning of parts for O.E.M. — you'll find Liquid Honing paying for itself in a short time.

CONVENTIONAL methods prove slow and inefficient for deburring and cleaning the almost microscopic holes in this Diesel fuel injector cup. But Liquid Honing does the job *eight times as fast* — one man and one machine equaling the former production of eight men using another method. Best of all, Liquid Honing produces a smooth surface that promotes better fuel flow and cuts down gum and carbon deposits.

*Liquid Honing and Vapor Blast are trademarks.



to learn the whole story ...

Send one of your parts for a processing demonstration and complete engineering report on the possibilities of Liquid Honing in your plant. No obligation.



VAPOR BLAST MFG. CO.
3005 WEST ATKINSON AVENUE
MILWAUKEE 16, WISCONSIN

Organizes New Company

Raymond L. Schwartz of Twin Falls, Idaho, has purchased certain assets of Cummins Diesel Sales Corporation, Boise, Idaho, and has organized a new company known as Cummins Idaho, Inc. Temporarily, the new Cummins Distributorship will operate at 1204 Front St., Boise. However, plans call for the erection of a new sales and service headquarters at Boise in the near future. Cummins Idaho, Inc., will sell and service Cummins diesels in 18 central and western Idaho counties as well as Malheur County in Oregon. Mr. Schwartz has, until recently, been the Diamond T dealer at Twin Falls, Idaho.

St. Louis Ship Acquires Affiliate

St. Louis Shipbuilding & Steel Company has announced that Engineering Controls, Inc., has become an affiliate. Engineering Controls, Inc., is the exclusive manufacturer of "Vapor Phase" patented engine cooling systems. Main offices of the concern will be located in the Paul Brown Building, 818 Olive Street, St. Louis 1, Missouri.

Mr. Lloyd Harbert is president of the Company and will maintain offices at 1939 North Hillhurst Avenue, Los Angeles 27, California. Mr. Wren Malone has been named vice-president and general manager at the St. Louis address.

Vapor Phase Systems utilize the boiling principle to cool engines and compressor cylinders.

Order Buses From Mack

Mack Trucks, Inc., reported receipt of orders totaling more than \$3 million for 128 new buses for transit systems in Chicago and New York. Robert W. Tyson, Jr., vice president and manager of Mack's Bus Division, said contracts have been signed with the Chicago Transit Authority, and Surface Transportation Corp., of New York.

Mr. Tyson said delivery on the Chicago order will begin in the fall. The buses will seat 49 passengers and will feature extra-large interior space. The buses will be 102 inches in width as compared with the conventional 96-inch width provided by many buses.

Mr. Tyson said delivery of the buses under the New York order start during the summer. These buses will be of the large 51-passenger type powered by the Mack Thermodyne diesel engine. They also will include such Mack features as pressurized ventilation systems, extra-wide aisles, exceptionally high head room and the airglide suspension systems.

Expand Sales and Service

Sales and service operations for White and Autocar trucks will be expanded in Rhode Island and Southwestern Massachusetts because of the growing importance of this area as a trucking center, according to an announcement by P. E. Tobin, general sales manager for The White Motor Company.

A change in corporate name of the distributing company for the area accompanied the expansion announcement. Now known as New England Truck Center, Inc., the firm will provide one of the most modern truck sales and service facilities in New England. Providence operations at 40 Branch Avenue are being given a complete face-lifting. The firm will operate a New Bedford, Mass., branch dealership at 95 S. Water Street.

Two former branch managers for White head up the Providence firm. J. D. Courtright managed the St. Louis branch for White and has been on the national sales staff for the company for the past several years. Mr. Sterling came to Providence from Kansas City where he managed White Sales and Service. Courtright



AUTHORIZED FUEL INJECTION SERVICE

prompt • efficient • reliable

For "original maker" quality service on your diesel fuel injection equipment—just get in touch with your nearest official

American Bosch service station (see list at right). Here factory-trained experts will give you prompt, efficient service, using specially designed tools and test equipment plus genuine American Bosch replacement parts. It all adds up to fast, accurate repair work that will save you time and money and keep your diesels on the go.

AMERICAN BOSCH

Springfield 7, Massachusetts

A Division of American Bosch Arma Corporation

is president and E. C. Sterling is vice-president and treasurer.

Trucker Repowers With Diesel

Nighthawk Freight Service, Chicago Illinois, has just completed a 10 tractor Cummins repowering program. "The purpose of this program," according to N. P. Brodarick, president of the 30-

year-old common carrier, "was to modernize these units with engines that develop more power and at the same time increase the mileage per gallon of fuel consumed."

To accomplish this goal, Mr. Brodarick's firm purchased 10 Cummins 175 horsepower Model JT-6-B Turbodiesels from Cummins Illinois Engine Sales, Inc. of over-the-road tractors and 95 trailers in

Chicago. This Cummins distributorship made the installations which entailed the removal of gasoline engines from International Harvester, Hendrickson and General Motors chassis. The Turbo-diesel engined tractors are expected to currently, the Chicago firm operates 77 Cummins Illinois Engine Sales, Inc. of over-the-road tractors and 95 trailers in

general freight service between Chicago and St. Louis. With five tractors, Mr. Brodarick formed the company in 1926 as Brodarick Nighthawk Way. The company name was changed to Nighthawk Freight Service in 1932. Officers of the company beside Mr. Brodarick are: C. J. Schwarting, Chairman of the Board; Wm. McGreevey, Vice President; and Robert Schwarting, Sales Director and Assistant Treasurer. Gross revenue of the common carrier in '55 was \$1,800,000.

Nighthawk purchased its first Cummins diesel in 1949, when the company installed a 150 hp Model HB-600 in an International Harvester tractor. This unit has logged 600,000 miles, and as Mr. Brodarick says: "It's still running strong." Including the 10 JT-6-B Turbodiesels, Nighthawk operates a total of 37 Cummins diesels in over-the-road tractor units.

Changes New York Address

The Briggs Filtration Company of Washington, D. C., announces a change in location of their New York office to 420 Lexington Avenue, New York 11, New York, telephone: Lexington 2-5840.

Frederic B. Town, Briggs district manager, handling the Manhattan area and all marine applications in the New York City area, believes the improved facilities will enable him to serve this area more efficiently. The Briggs Filtration Company are one of the pioneers in the designing and manufacturing of filtration equipment.

Contracts for Mobile Drilling Unit

Louisiana Offshore Drilling Company of New Orleans, La. made award of a contract to Ingalls Shipbuilding Company, Pascagoula, Mississippi for a self-stabilizing, submersible drilling vessel to operate in sixty-seven feet of water in the open Gulf, and that construction has already begun.

The vessel will be stabilized by four recessed pontoons operated hydraulically, when the hull is being raised or lowered. The drilling and machinery decks will be supported on fixed columns, secured to the hull. Present plans call for Brewster N-12 drawworks with two Emsco 1,000 hp pumps. The specially constructed Lee C. Moore 143 ft. cantilever full view mast will have a derrick rating of 1,000,000 pounds lift, will be adjustable so that three holes may be drilled at one location without moving the vessel, and will be capable of drilling to depths of up to 20,000 feet. The mud pumps, drawworks and rotary will be dc electric motor driven. The three main diesel generators will be Alco Model 5-SY-3771.

AMERICAN BOSCH FUEL INJECTION SERVICE STATIONS

ALABAMA

Birmingham, 3 Birmingham Electric Battery Co.

ARIZONA

Casa Grande Diesel-Electric Service Co.
Mesa Perkins Diesel Service
Phoenix Charlie C. Jones Battery & Electric Co.

Tucson Auto Plane Electrical Service
Yuma Yuma Automatic Electric

N. Little Rock Womack Bros. & Taylor

CALIFORNIA

Bakersfield Automotive Diesel & Electric Co., Inc.
El Centro Valley Automotive & Diesel Serv. Co.

Eureka Gustafson Diesel & Electric
Fresno Winter Bros.
Los Angeles Diesel Precision Company, Inc.
Los Angeles, 21 Magnate Sales & Service Co., Inc.
Oakland Diesel Injection & Governor Serv., Inc.

Oakland Pimental & Son
Sacramento Diesel Pump & Injector Service
Sacramento, 6 Langer & Rikin
Salinas Haag Diesel & Electric
San Bernardino Diesel Injection Service
San Diego Electric Diesel & Equipment Co.
San Francisco, 24 McKinley Corporation of California
South Gate Diesel Fuel Injection Lab.
Wilmington Diesel Control Corp.

COLORADO

Denver, 3 Central Auto Electric Company

CONNECTICUT

Hartford W. J. Connell Co. of Hartford

DISTRICT OF COLUMBIA Diesel & Ignition Service Inc.

FLORIDA

Jacksonville Diesel Electric Service, Inc.
Miami Patten Sales Co., Inc.
Miami, 36 Dade Diesel Company
Orlando Florida Diesel Service Co.
Tampa Interstate Diesel Service
Stuart Diesel Service

GEORGIA

Atlanta, 3 Auto Electric & Magneto Co.
Cairo Grady Motors

IDAH0

Blackfoot Auto Parts Service Co.
Boise Magneto & Diesel Supply Co.
Lowiston Osterman Diesel & Electric Co.
Twin Falls Diesel Pump & Injector Service

ILLINOIS

Chicago, 16 Illinois Auto Electric Co.
Mendota Walzer's Diesel Service
Peoria Automotive Ignition Co.
Rock Island Lohse Automotive Service

INDIANAPOLIS, 4 Gulling Auto Electric Inc.
Muncie Smith Brothers Garage
Valparaiso Diesel Service Company

IOWA Electrical Service & Sales Co.
Huver Equipment

KANSAS Bell Diesel Injection Service
Bell Engine Service
Grinnell Electric & Diesel Service Co.

Salina The Motor Service Company
Wichita E. S. Cowie Electric Co.

KENTUCKY

Louisville Diesel Injection Service
Louisville Schaeff Auto Electric Co.
Paducah Story Electric & Battery Co.

LOUISIANA

Baton Rouge Womack Bros. Diesel Service
Bossier City Vaughan Tractor & Auto Parts Co.

Morgan City Landry's Diesel Injector Service
New Orleans Gerhardt's Inc.

New Orleans, 13 John M. Walton, Inc.

MAINE

Portland Eastern Diesel Service Co.,
Portland Tractor Co., Inc.

MARYLAND

Baltimore, 1 Parks and Hull Automotive Corp.

Baltimore, 2 Stephen Seth & Co.

MASSACHUSETTS

Boston Boston Fuel Injection & Engine Service

Boston, 64 W. J. Connell Company

Boston, 10 Wharf Machine & Electric Co., Inc.

Fairhaven Hathaway Machinery Co., Inc.

Fairhaven C. A. Krohn & Sons

MICHIGAN

Detroit Knorr-Maynard, Inc.

Lansing Diesel Equipment Sales & Service

MINNESOTA

Hibbing Diesel Service Company

Minneapolis, 2 Diesel Service Company

Minneapolis, 2 Reinhard Bros. Co., Inc.

MISSISSIPPI

Jackson Womack Brothers

MISSOURI

Kansas City, 8 Electrical & Magneto Service Co.

St. Louis, 2 Diesel Fuel Injection Service Co.

St. Louis, 3 Electric Parts and Service Co.

MONTANA

Billings Original Equipment, Inc.

Havre Midwest Diesel Injection Sales & Service

NEBRASKA

McCook Automotive Sales & Service

Omaha, 2 Carl A. Anderson, Inc.

NEW JERSEY

Newark, 2 Tire Trading Company, Inc.

Somerville Battery & Electric Service Co.

Trenton, 9 Steinert Diesel Injection Service

NEW MEXICO

Albuquerque Central Auto Electric Company

NEW YORK

Brooklyn A & D Diesel Service, Inc.

Buffalo, 8 Hettich Electric Service

Hempstead, L. I. A & D Diesel Service, Inc.

Pelham Manor Corlett-Gross, Inc.

Rochester Union Carburetor & Ignition Service

Troy Ehrlich Electric Service, Inc.

Utica Stevwater Electric Co., Inc.

Woodsdale, 7 American Bosch Div. American Bosch Arma Corp.

NEW YORK

Charlottesville, 2 Carolina Rim & Wheel Co.

Raleigh Diesel Injection Sales & Service

NEW YORK

Fargo Northwestern Diesel Service Co.

Minot Diesel Service Company

Williston Crichton Motor Co.

OHIO

Akron Standard Motor Parts

Cincinnati Tri-State Distributing Corp.

Cleveland, 14 The Cleveland Ignition Co.

Columbus, 15 Columbus Ignition Co.

Lisbon Diesel & Supply Co., Inc.

Sidney Hoover Body & Diesel Service Co.

OKLAHOMA

Oklahoma City, 2 American Electric-Ignition Co.

Tulsa Magneto Ignition Company

OREGON

Klamath Falls Specialized Service Co.

Pendleton Eds Magneto & Diesel Co.

Portland, 14 Automotive Products, Inc.

Roseburg Diesel Injection Service

PENNSYLVANIA

Harrisburg Penn Diesel Service Co.

Hazleton Penn Diesel Service Co.

Mt. Carmel Gengler's Diesel Service & Sales

Philadelphia North American Diesel Injection Co.

Philadelphia Sullivan Brothers

Philadelphia Keystone Diesel Inj. Service

Pittsburgh, 6 Automotive Ignition Co., Inc.

SOUTH CAROLINA

Charleston Diesel Fuel Injection Service

Columbia Boney Diesel Works Co., Inc.

SOUTH DAKOTA

Lemmon Josund Auto Electric

Rapid City Hoshet Auto Electric

Sioux Falls Reinhard Brothers Company

TENNESSEE

Knoxville, 28 Josund Auto Electric

Memphis, 4 Diesel-Magneto Service Co.

Nashville Automotive Elec. Service Co.

Precision Parts Corp.

TEXAS

Beaumont Diesel Engine & Pump Co.

Dallas, 1 Beard & Stone Electric Co., Inc.

El Paso Reynolds Batt. & Mag. Co.

Houston Beard & Stone Electric Co., Inc.

Houston Diesel Pump & Injector Service

Odessa Magneto & Diesel Injector Service

Pampa Electric Service & Supply

San Antonio Radcliff Bros. Elec. Co.

San Antonio S. X. Callahan

Womack Bros.

UTAH

Salt Lake City Diesel Electric Service & Supply Co.

Salt Lake City Midwest Service & Supply Co.

Norfolk Diesel Injection Sales and Service

Richmond C. H. Woodward Electric Co., Inc.

Salem Diesel Injection Sales & Service

WASHINGTON

Seattle Seattle Injector & Electric Co.

Spokane Spokane Diesel & Electric Co.

Spokane Sunset Electric Co.

Walla Walla Walla Motor Supply, Inc.

Yakima Diesel & Electric Service Co.

WEST VIRGINIA

Charleston Mountain Service

WISCONSIN

Milwaukee Wisconsin Magneto Company

WYOMING

Casper Cotter Battery & Electric Company

Mills Diesel Service Company

ALASKA

Anchorage Automotive Diesel Electric Supply & Overhaul

Juneau Van's Diesel Service

CANADA

Calgary, Alta. Hulton's, Ltd.

Edmonton, Alta. Smith Battery & Auto Electric

Fredericton, N.B. Stairs Bros. Fuel Injection Service Station

London, Ont. Universal Ignition & Battery Ltd.

Montreal, Que. International Electric Co., Ltd.

Ottawa, Ont. Northam Equipment, Ltd.

Peterborough, Ont. Welch & Johnston, Ltd.

Quebec, Que. A. C. Curtis, Ltd.

Regina, Sask. Quebec Gas & Diesel Engines, Ltd.

St. John's Electric Motor Service

Newfoundland A. H. Murray & Co., Ltd.

Saskatoon, Sask. Lambert Electric, Ltd.

Toronto, Ont. A. Cross & Co., Ltd.

Toronto, Ont. Auto Electric Service Co., Ltd.

Toronto, Ont. Westway Auto Electric Ltd.

Vancouver, B. C. Fred Holmes Fuel Inj. Sales & Service Ltd.

Vancouver, B. C. Jeffree & Jeffree, Ltd.

Vancouver, B. C. Vivian Diesels & Munitions, Ltd.

Winnipeg, Man. Brown & Murray, Ltd.

HAWAII

Honolulu Honolulu Iron Works Company

Honolulu Kawashio Ltd.

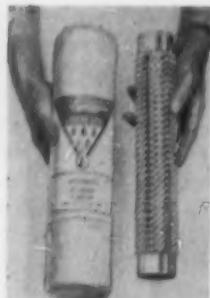
Honolulu Todoki Machine & Marine Works

PUERTO RICO

San Juan General Farm Equipment Co.

(List of foreign service stations available on request)

The New Maxiflo Filter



A new Maxiflo filter with a novel Maxiflo core has been developed by Engine Life Products Corporation to cope with the lubricating needs of modern engines. Larger lubricating oil pumps, capable of delivering increased oil flow and of being subjected to higher pressures, made the need for an advanced full-flow filter imperative, according to the manufacturer. One which effectively removes all abrasive particles and contaminants,

fully protecting the closely fitting bearings and other working parts of the engine, was needed. The new line of Maxiflo filters and replacement elements are the Engine Life Products Corporation's answer to that problem. Each Maxiflo core is designed to handle velocity flows and pressures without differential restriction, thereby creating a more static condition within the entire filter. The core has made possible the use of different filtering media in which not only lubricating oils but gasoline, diesel fuel, residuals, crudes and other fuels can be filtered, where flow rate is of paramount importance, but a high degree of filtration is also essential. Engineering details on this new filter may be had from the maker, Engine Life Products Corporation in El Monte, California.

ITS NEW

The World's Leading Manufacturers of FUEL INJECTION EQUIPMENT for *Diesel Engines*



Depots and Service Agents in over 100 Countries.



C.A.V. DIVISION OF LUCAS ELECTRICAL SERVICES INC., 653 TENTH AVENUE, NEW YORK, 36, N.Y.
Sales Office: 14820 DETROIT AVENUE, CLEVELAND, 7, OHIO.

AP 174-754

White Appointments



J. P. Dragnin



Henry J. Pipp



John A. Sargent

The election of J.P. Dragnin as vice president-finance of The White Motor Company, and Henry J. Pipp as controller, were announced by Robert F. Black, board chairman and president, following the regular monthly meeting of directors of the large Cleveland-based manufacturer of trucks, truck tractors and diesel engines. Mr. Dragnin, 47 years old, for a number of years has held the position of controller of White and has devoted his entire business career to corporate finance. Mr. Pipp formerly held the position of assistant controller of White.

At the same meeting, John A. Sargent, 46-year-old president of Diamond Alkali Company, was elected a director. "The election of Mr. Sargent brings to the White Motor board one of the country's leading young industrialists," Mr. Black said. Mr. Dragnin joined White Motor in 1945 as technical assistant in the field of audit and systems. Two years later he was appointed assistant controller and in 1951, when White acquired Sterling Motor Truck Company, he was elected assistant vice president-finance of this operation.

Mr. Pipp, the newly elected controller, has just completed ten years of service with White. He joined the company as staff assistant to the controller after serving as assistant controller of Massey-Harris Co. of Racine, Wisconsin.

Mr. Sargent, the newly elected director of White Motor, is a graduate of the Sheffield Scientific School of Yale University. He advanced to the presidency of Diamond Alkali in less than eight years after joining the company in 1946.

Advertising Manager



D. J. Clymer

The appointment of D. J. Clymer as advertising manager of the Detroit Diesel Engine Division of General Motors has been announced by Robert E. Hunter, general sales manager. Mr. Clymer joined Detroit Diesel's technical publications department in 1943. He was later in charge of distributor sales management programs and national trade shows and also assistant to the advertising manager.

"Mobile Diesel Center"



Three executives of Cummins Engine Company, Inc., Columbus, Indiana, inspect one of the cutaway units to be carried in the new Cummins Mobile Diesel Center. From left to right: H. E. Bollwinkel, executive service manager; E. Don Tull, executive vice president; and R. E. Huthsteiner, president.

THE Service Division of Cummins Engine Company, Inc., Columbus, Indiana, is now sending a unique "Mobile Diesel Center" to the field. According to H. E. Bollwinkel, Cummins' executive service manager, "The purpose of the mobile demonstration unit is to bring the latest service information on Cummins Diesels directly to service men throughout the country. We, at Cummins, realize the importance of taking the factory to the field, and we expect this, the first of our new mobile centers, to contact about 10,000 service personnel within the next 12 months."

The Cummins Mobile Diesel Center is unique in that it is a self-contained unit having its own stage, lights, chairs, public address system, props, etc., all built into a single package. As Mr. Bollwinkel says, "Wherever a truck can be driven, we can take the Mobile Diesel Center and hold a service program." The body is transported on an International Harvester Model CO 205 tractor powered with a 175 horsepower Cummins JT-6-B turbodie-

sel. Lowering and raising of the body is accomplished by three built-in hydraulic jacks operated from a 110-volt electrical system. The body is lowered to a point 10 inches above the floor before it is opened for the meeting. After a demonstration it is raised 66 inches off the floor and the tractor backed underneath; the body is then lowered into a cradle mounted on the chassis where it is secured before moving on to its next location. Set-up time for the complete show is only 50 minutes.

Materials carried in the Mobile Diesel Center will permit tailored programs that will be directed to owners, maintenance superintendents, shop foremen, driver and safety supervisors, and drivers, as well as Cummins Distributor personnel. The unit was designed by Harry Weese and Associates, of Chicago, Illinois. Emmert W. Wright, Cummins' Manager of Service Development, is directly in charge of its construction as well as its future activities. Two service instructors are assigned to the unit, and will conduct the service demonstrations.

"Nancy Bee III"



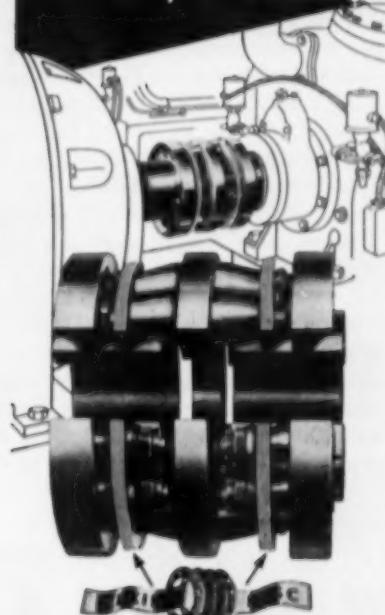
The *Nancy Bee III*, a 43 footer is truly a distinguished cabin cruiser that was built for speed as well as comfortable cruising in Florida waters, was recently repowered from gasoline engines to two General Motors 4-71 inclined diesels, models 4087 and 4088 with GM 1.5:1 hydraulic reduction gears by General Engine & Equipment Co. of Tampa, Florida. The new installation features chrome plated piping, filters, and specially built stainless

steel mufflers. The 43 ft. cabin cruiser is shown on its trial runs in Tampa Bay. The speed was increased to over 20 mph and fuel consumption dropped one half.

The two GM 4-71 inclined diesels was engineered by General Engine & Equipment of Tampa. With its new 18 x 22 propellers and new engines the speed increase was 2 mph over the gasoline engines.

Specify THOMAS ^{ALL METAL} FLEXIBLE COUPLINGS

for Power Transmission to avoid Costly Shut-Downs

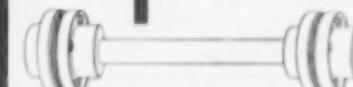


Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.



Typical Heavy Duty Application on Multiple V-Belt Drive

DISTINCTIVE ADVANTAGES	
FACT	EXPLANATION
NO MAINTENANCE	Requires No Attention, Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts, Freedom from Shut-downs.
NO BACKLASH	No Loose Parts, All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment, No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling, Elastic Constant Does Not Change, Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

Mid-Continent Diesel News

By Jack F. Cozier

COSMO CONSTRUCTION CO., Oklahoma City, Okla., purchased a model 44 Lima dragline powered by a GM 4-71 diesel engine for work on the highway 66 bypass near Tulsa. The sale was made by R. A. Young & Son, Inc., Tulsa, Okla.

C. L. ROGERS, pipe line contractor, Wichita Falls, Texas, bought a Cleveland 140 dumper powered by an International UD-350 diesel from Leland Equipment Co., Tulsa, Okla.

NELSON BROTHERS, Iola, Kansas, received two GM model 6051-C diesel engines with Cotta reduction units to power a Cedar Rapids impact crusher. Delivery was made by K C Diesel Power Co., North Kansas City, Mo.

CITY OF TULIA, TEXAS, municipal plant has awarded a contract for two 1600 hp. engines to Nordberg Mfg. Co. The engines will be Nordberg dual fuel supairthermal engines.

SOUTHEASTERN Construction Co., Tulsa, Okla., has purchased a 22-B Bucyrus-Erie clam, dragline and backhoe powered by a GM 4-71 diesel engine for sewer work. The sale was made by Butler-Sparks Equipment Co., Tulsa, Okla.

MCNABB COAL CO., Catoosa, Okla., has bought a LeRoi 600 diesel air compressor from Midwestern Engine & Equipment Co., Tulsa, Okla. The compressor will be used with a wagon drill.

GREGG CONSTRUCTION CO., Henryetta, Okla., is repowering a Browning crane with a GM 4055 diesel engine to be used on construction work. The en-

gine was obtained from Diesel Power Co., Tulsa, Okla.

BYRON-JACKSON CO., Tulsa, Okla., purchased two Buda DA-779 diesels to power two centrifugal pumps for export. The sale was made by Allis-Chalmers Mfg. Co., Buda Div., Tulsa, Okla.

GLOBAL SUPPLY, INC., Whittier, Cal., has ordered a rebuilt GM diesel engine model 12103 OH from Diesel Equipment Co. Co., Inc., Wichita and Great Bend, Kan. This unit will be used in oil operations in Africa.

SECREST PIPE COATING CO., Tulsa, Okla., bought a Cat D7 tractor and pipe layer from McCormick Machinery Co., Tulsa, Okla. The unit will be used for side boom pipe line work.

STANOLIND OIL & GAS CO., Tulsa, Okla., purchased a LeRoi L-3000 gas engine for use on a Peerless deep well turbine pump for pumping from 1200 ft. on salt water for water flooding near Duncan, Okla. The sale was made by Carson Machine & Supply Co., Tulsa, Okla.

RUSSELL RALPH CO., Emporia, Kan., is repowering a model 304 Koehring crane with a GM model 3030-C diesel engine received from K C Diesel Power Co., North Kansas City, Mo.

B & M and Merritt, Chapman and Scott, Oklahoma City, Okla., received a Cleveland 140 dumper to be exported to Spain. The unit is powered by an International UD-350 diesel engine and was sold by Leland Equipment Co., Tulsa, Okla.

ELDON SMITH, Quapaw, Okla., bought two Euclid 23 TDT scrapers powered with 6110 GM diesels with torque converters. Smith will use the units on toll road work. The sale was made by Butler-Sparks Equipment Co., Tulsa, Okla.

H. C. PRICE CO., Bartlesville, Okla., has purchased a Cat D7 tractor with four 300 amp Lincoln welders from McCormick Machinery Co., Tulsa, Okla. The tractor unit will be used for pipe line welding.

SMITH BROTHERS, Noble, Okla., bought a model 44 Lima shovel through R. A. Young & Son, Inc., Tulsa, Okla. The shovel powered by a GM 4-71 diesel engine will be put into operation on the turnpike near Adair, Okla.

KANSAS-NEBRASKA Natural Gas Co., Inc., Phillipsburg, Kan., has in operation a LeRoi H-540 natural gas engine on a gas compressor. The unique was sold by Carson Machine & Supply Co., Great Bend, Kan., and was set in Wyoming.

MURFIN DRILLING CO., Wichita, Kan., has purchased a GM model 12240S diesel engine, twin 6-110, to power their rotary rig operating near Kimball, Neb. The engines were purchased from Diesel Equipment Co., Inc., Wichita and Great Bend, Kan.

LUTHER HARPER, pipe line contractor, Tulsa, Okla., has in the field a Cleveland 140 dumper purchased from Leland Equipment Co., Tulsa, Okla. The unit powered by an International UD-350 diesel engine is now outside of Muskogee, Okla., working on a gas line.

JOHN J. STARK, Girard, Kan., purchased a GM model 4031-C diesel engine to power a Universal 20" x 36" jaw crusher from K C Diesel Power Co., North Kansas City, Mo.

OSCAR SCHULTZ, farm power contractor, Okmulgee, Okla., received a Cat D7 tractor and bulldozer from McCormick Machinery Co., Tulsa, Okla.

ACE CONSTRUCTION CO., Oklahoma City, Okla., bought a Unit 510 crane mounted on a Crane Carrier truck powered by a GM diesel engine for general construction work. The sale was made by Midwestern Engine & Equipment Co., Tulsa, Okla.

FRANK WHEATLEY, Pump & Valve Manufacturer, Tulsa, Okla., received one Buda 6B-273 natural gas engine to power a pipe line pump for use on a pipeline around Davenport, Okla. The engine was received from Allis-Chalmers Mfg. Co., Buda Div., Tulsa, Okla.

PUBLIC SERVICE CO., Tulsa, Okla., is repowering a Plymouth locomotive with a GM model 680 diesel engine from Diesel Power Co., Tulsa, Okla. The locomotive is used to move coal around the main power plant.

JOHN DUNKIN, Wagoner, Okla., purchased a Cat D6 tractor with bulldozer arrangement for agricultural use on his farm near Wagoner. The tractor was delivered by McCormick Machinery Co., Tulsa, Okla.

BROCE CONSTRUCTION CO., Woodward, Okla., has recently put into operation two Cedar Rapids crushers, one a Commander plant and the other a 3AGR primary crusher, at Big Cabin on the turnpike. The units are powered by GM 6-71 diesel engines and were sold by Leland Equipment Co., Tulsa, Okla.

MCMICHAEL CONCRETE Co., Tulsa, Okla., received a Unit 1014 crane mounted on a Crane Carrier truck from Midwestern Engine & Equipment Co., Tulsa, Okla. The crane, powered by a GM 2-71 diesel engine will be used for general construction work.

TRIPLE PLAY AT FLOOD TIME

by Cecil Diesel
ROVING REPORTER



As one Oakland city official puts it, "We're so sure those Quincys will always start, we don't even have an attendant here." Even if all electric power would fail, gasoline-powered Quincys start the diesels anyway . . . and supply air for controls.



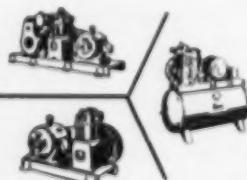
And there's a Quincy Compressor for every diesel starting job. Let Quincy help you select the right model from a range of mountings and sizes — from 1 to 90 CFM. Write them for a catalog.

Quincy
COMPRESSORS

Diesels start purring . . . pumps start pumping . . . and Quincy Model D340 Compressors start humming. Here's what's happening. Flood water level rouses four pump-driving Enterprise DSG-510 Diesels to action. Then as tank air pressure drops below 220 pounds, Quincy Compressors automatically start . . . build pressure back up.

QUINCY COMPRESSOR CO.
DEPT. K-49, QUINCY, ILLINOIS

World's finest air compressors



Midwest Diesel Notes

By L. H. Houck

MORE MIDWEST farmers are turning to dieselize tractors and there is a definite upsurge in the use of diesel crawlers on farms of all sizes. Dealers in International, Caterpillar, Oliver, Terratrac, Allis-Chalmers report increased farm sales and increased inquiries. This is attributed to a trend to reduce labor costs and handle more plows in the same working day. There is double the number of small crawler tractors on the Missouri bottom farms as compared with three years ago.

INTERESTING INSTANCES of the toughness of the diesel are continually popping up but few are salvaged from the ocean's bottoms to resume a normal life as happened at Honnigsvag, Norway. This village salvaged a diesel from the German battleship *Tirpitz*, which was sunk in 1944 by British bombers in a Norwegian fjord, and it is now generating power for the village.

REPOWERING of an IHC truck for Wiley Barnes, Troy, Tenn., has been completed by Cummins Diesel Corp., Memphis, with a 175 hp Model JT-6-B Cummins diesel. The unit is used in general highway hauling.

CLAYTON, CROWSON & TAYLOR, construction firm of Fulton, Mo., has put a Caterpillar D7 in service from Fabick & Co., Jefferson City. It is equipped with a 78 cable bulldozer with triple sheave unit and a LeTourneau rear double drum cable control.

EUCLID-MEMPHIS SALES, Inc., Memphis, Tenn., is starting delivery of the world's largest order for road machinery. R. A. Tripper, president, placed a \$7 million order with the Euclid division of GM last fall to supply his customers this spring and summer. The order was signed Dec. 28 with Cyrus R. Osborn, vice-president GM, and Ray Armitage, general manager, Euc division present. Euclid officials said Euclid-Memphis has sold 10 per cent of the firm's production in the last 10 years.

LEO LEHMEN, Linn, Mo., has accepted delivery of a D2 Caterpillar with Trackson T-2 Traxcavator with a 63-in. bucket, from Fabick & Co., Jefferson City, to be used in clay mining.

CENTRAL STONE CO., Huntington, Mo., has repowered a Northwest crane with a 95 hp, Model J-6-BI Cummins diesel from Cummins-Missouri Corp., St. Louis.

TEXAS-ARIZONA MOTOR Freight

Lines, El Paso, Texas, have added 30 Kenworth tractors with Cummins diesels to its fleet and they are being used in the El Paso-Los Angeles run.

GEORGE E. FAILING CO., Enid, Okla., bought four Buda 6DT-317 diesel engines to power some of their model 1500 rotary rigs for export. The sale was made by Allis-Chalmers Mfg. Co., Buda Div., Tulsa, Okla.

CHAMNESS BROS., Carterville, Ill., have purchased a 22-B Bucyrus-Erie shovel with a UD-525 International diesel from Brandeis, Paducah.

FRONT-MOUNTED 400 hp diesel engines feature the London, Eng., new fleet of 9,400 busses, in a \$135 million program in which old busses are being scrapped. New jobs seat 64, an increase of 8, and engine radiators are concealed in the floor and will be used to put heat in London busses for the first time.

WILFRED B. TATE, Portland, Mo., will use a Cat D7 in his farm operations this year, having accepted delivery of the unit this winter. It has an 80-inch dozer blade, backrip scarifiers and will be used for farm tillage, ponds and terracing.

BRANDEIS, Evansville, Ind., have sold a Bucyrus-Erie 51-B shovel with Caterpillar D-337 diesel engine with torque converter (Twin Disc) to Roy Ryan Sons Co.

UNITED ROAD MACHINERY CO., Memphis, Tenn., has moved into its new building at 2010 So. Bellevue, U.S. 51, south, according to S. I. Jaffe, owner and manager, and it has new display rooms and new shops. Among its lines is Lorraine, Huber-Warco graders and rollers, all with optional diesel engines.

REMEMBER the pocket battleship, *Graf Spee*, the German raider sunk by British battleships near Montevideo? Rudi Mittag, 36, was machinist's mate, and escaped from an Argentine internment camp, and is now chief diesel engineer for the municipal power plant of Lowell, Mich. He has an American wife and has applied for citizenship. His native Saxony is behind the Iron Curtain, and rather than return to Russian control, he escaped and was the only one to reach the U.S.

INCREASED HIGHWAY work lead to the purchase of a Caterpillar No. 12 grader from Fabick & Co., Jefferson City, by Eugene Sellers, Curryville, Mo.

REPOWERING OF a Mack truck for highway operation has been completed by Cummins Diesel of Northern Ohio, New Philadelphia, for Albert Hrobak, 1004 Garken St., Warren, Ohio.

SHULER-MATHIS, Noble, Ill., has purchased a TD-18-A International tractor from Brandeis, Evansville office.

PATTERSON-REDMOND Equipment, Inc., International dealers in New Orleans and Baton Rouge, will be in a new building this spring south of the Baton Rouge traffic circle which connects US 190 and 61. The New Orleans division will remain in its present quarters. President L. M. (Pat) Patterson officiated at ground-breaking in Dec.

CHICAGO TRANSIT AUTHORITY plans to lease 100 dieselize busses to supplement the planned purchase of 400 buses and 330 PCC rapid transit cars during the next five years.

MOLAND BROS. TRUCKING CO., Duluth, Minn., has purchased 30 COE International DTC-405 tractors with diesel engines, for use on regular routes.

CUMMINS 190 hp engines with GM Allison torque converter is the power for the new Galion motor grader Model T-700, now in production and soon ready for mid-west dealer stocks. The maker claims the torque converter multiplies engine torque up to 340% automatically as needed in an infinite number of ratios, which prevents load shocks, engine lugging or stalling.

RADCLIFF & BERRY, Orleans, Ind., have bought an International TD14A tractor with a Drott loader from Brandeis at Evansville.

SAWMILL OWNED by Frank B. Powell Lumber Co., Rolla, Mo., has a new power unit—a Caterpillar D-318 diesel from Fabick & Co., Jefferson City.

JACK COLE CO., freight line operator with headquarters at Birmingham, Ala., has bought 45 GMC tractors with sleeper cabs and 6-71 GMC diesels.



Above, Ferry Balfour, British Columbia, powered and steered by two Harbormasters.



Catherine Graham, showing Harbormaster elevated for inspection.

Harbormasters are ready answer to many tough marine power and steering problems

these heavy duty outboard propulsion and steering units are a complete package, compact and easily installed

Quickly and easily installed

Harbormasters are assembled and tested at the plant and are ready for immediate use on barges, ferries, fishing craft, tugs, lighters, dredges, etc. In many cases Harbormasters can be installed and ready to go merely by mounting with four hold-down bolts. Even on largest units, only fuel tanks and controls are installed separately.

Outstanding maneuverability

You have 360-degree maneuverability and can dock or maneuver in crowded quarters, stay headed into the current on sharp river bends or in tide rips, run into locks without losing time, shunt or pick up barges with precision, or reverse with full power.

Rugged-Powerful

With these outboards you get more actual delivered thrust per H.P. than with the same engine with an inboard system. Harbormasters are heavy duty equipment, built ruggedly for long life. They are ideal for coastwise service as well as in harbors, lakes, canals, and rivers.



Easy service and maintenance

Special 180° elevating mechanism allows one-man operator to raise entire submerged assembly to any degree he desires. No dry docking or diving is necessary for repairs.

Shallow water protection

In shallow water, shear pin lets tall section ride up and over submerged obstacles. Shear pin is easily replaced while underway. If desired, the unit can be operated with tall section in partially elevated position to reduce draft.

Models and installations to meet your needs

Four series are available with models ranging from 40 to 400 h.p. All are designed for installation on existing powered or unpowered craft and on new craft of all types. In many cases the installation can be made with no alterations to the hull whatever.

Harbormaster Outboard Propulsion and Steering is the money-saving way to solve many tough marine power and steering problems. Recommendations are available without charge, based on hundreds of installations. Send for New Catalog giving complete information and showing many Harbormasters in action.

MURRAY & TREGURTHA, INC.

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QUINCY 71, MASSACHUSETTS

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THEY CAN BE REPAIRED
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Fairbanks-Morse Award



Robert H. Morse, III, Acting General Sales Manager of Fairbanks, Morse & Co., Chicago manufacturer of diesel engines, pumps, motors, locomotives, scales and many dealer products, presents the Colonel Robert H. Morse Cup for top sales performance in 1955 to Mario A. Gasque, Manager of the Mexico City Branch of the company. Company officials present at the ceremony in Mexico City were, left to right: Paul A. Suess, Manager of F-M Los Angeles Branch; H. L. Hillery former Assistant General Sales Manager and now retired; William B. Morse, Assistant to Chief Product Engineer; O. S. Leslie, Vice-President, Manufacturing; Robert H. Morse, III, presenting cup; R. D. Brown, Assistant Secretary and Assistant Treasurer; Jorge D. Servano, Honor Salesman of Mexico City Branch; Mario A. Gasque, accepting cup; Henry J. Barbour, Manager Advertising and Public Relations; Justo E. Montemayor, Credit Manager of Mexico City Branch.

REFLECTING the terrific pace of Mexico's economic growth, the Mexico City Branch of Fairbanks-Morse & Co. became a two-time winner of the company's annual award for top sales performance in 1955. The Colonel Robert H. Morse Cup, the silver trophy on which is recorded the annual winner, was presented in a ceremony in Mexico City to Senor Mario A. Gasque, manager, and his Mexico City sales organization by Robert H. Morse, III, acting general sales manager.

Increased sales of most Fairbanks-Morse products—diesels, pumps, scales, and dealer products—contributed to Mexico City's success in exceeding its quota by a larger percentage than did any other of the company's 16 branches. The greatly ex-

panded, balanced-budget, public works program which Mexico has in process accounted for a large share of Fairbanks-Morse pump sales to power the country's growing number of water works. Mexico's business growth has kept pace. There has been need for more diesels and pumps for the expanding oil industry; scales and diesel generators for the meat packing industry; diesels for refrigerator plants and cotton gins; diesels for fishing boats; railroad and motor truck scales for the transport industry.

Mr. Morse pointed out that the 1955 Fairbanks-Morse top sales award to its Mexico City Branch illustrates how an American company, helping in a country's growth can grow with that economy.

Cummins Dieselized Crane



This new Bucyrus-Erie model 88 B, was recently put into operation on the new million dollar housing project being developed by Arthur V. Davis, Chairman of the Board of the Aluminum Company of America. These plush waterfront lots will cost up to \$20,000 each when the project, located south of Miami, is finished. The new unit is powered with a model LRBI 600 Cummins diesel rated 300 hp. Its capacity is 3½ yds. of rock and sand.

De Laval Chicago Appointments



W. H. Mouquin



C. C. Bray

W. H. Mouquin has been named district manager of the Chicago office of De Laval Steam Turbine Co., Trenton, N. J., and C. C. Bray has been appointed regional sales supervisor at the same office, according to an announcement by H. G. Bauer, vice president. These appointments in the new Chicago Sales and Service Headquarters in Forest Park, Illinois are part of De Laval's continuing expansion of customer sales and service facilities.

When you find the air compressor pumps up the pressure in about half the time it formerly did, do not decide it is turning out to be a better machine. Better try "draining the pickle" out of the air tanks.

Added to Growing Fleet

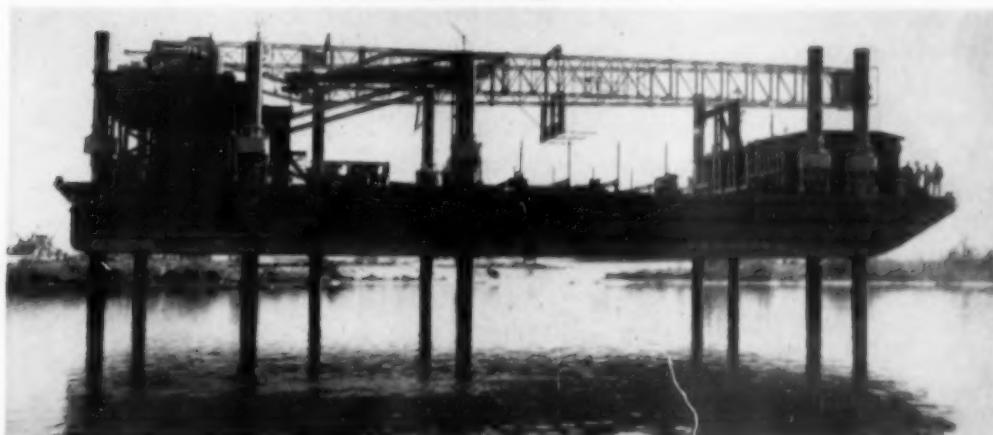


THE Grandy Boat Company has delivered the third of four 42 ft. by 14 ft. sports fishing vessels for service at Westport, Washington. These boats, built by Grandy, were designed by Edwin Monk with the sport fishing charter service in mind and are being acclaimed among the charter services as an ideal boat, well suited to meet the growing demand for deep sea sports fishing and the forerunner of a growing fleet of such boats. A large and unobstructed after deck, together with open side and forward decks, gives ample room for the playing of a hooked fish, while a pipe railing completely enclosing all decks adds the safety feature so important. Although designed primarily to give the sportsman every convenience while fishing, the

comfort of the fisherman has not been overlooked and the boat offers every comfort.

The three boats delivered to date are: The *Frank L. III*, owned by Frank L. Lambertsen and powered with a Cummins HRM 600 diesel; the *Fleetfisher*, owned by Harry L. Lewis and powered with the General Motors Series 71 diesel; The *Sea King*, owned by Leo J. Bordeaux and powered with the General Motors Series 71 diesel. A fourth vessel, the *Sea Breeze*, is now under construction at the Grandy yard and will be delivered soon to Arion Lewis. It will likewise be powered by the General Motors. Along with the *Frank L. III*, it will also be used for commercial fishing.

Drilling Barge No. 72



THE Port of Orange, Texas witnessed the completion and testing recently of the Barge Number 72, designed for the Mene Grande Oil Co. of Maracaibo, Venezuela, by Friede and Goldman, Inc., Naval Architects and Marine Engineers of New Orleans. Barge Number 72, which will be registered at Maracaibo, Venezuela, was designed to operate in 25 ft. of water in the lake, and to be elevated by means of a hydraulic spud jacking system utilizing hydraulic jacks built by Joe Stine, Inc., of Houston, to a height of 10 ft. above water level. She was built by the Lexington Shipbuilding Co., of Orange, Texas.

Basically Barge Number 72 is similar to one designed by Friede and Goldman for the Gulf Refining Company, which has operated on Caddo Lake for several years. Before making the ocean voyage to Venezuela she will be employed under charter by the Gulf Refining Company to drill one well west of Grand Bay, in the Gulf, near Morgan City, Louisiana. The National Supply type C-250 mud pump is driven by a Climax RX15VW diesel engine. The Emsco D-500 mud pump is powered by a Climax V-420 diesel. A Caterpillar D-13000 drives the generator. The anchor windlass drives are two General Motors, 50 hp each.

DIESEL ENGINES: With or Without Generator
FAIRBANKS-MORSE, 80 HP, 120 HP, 240 HP, 360 HP, 450 HP, 600 HP, 1000 HP.
NATIONAL SUPERIOR 960 HP Dual Fuel, and many others
PARTS: Pistons, Cylinders, Crankshaft, Nozzles, Pumps, Flywheels, etc.

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